



CITY OF ATLANTA

Kasim Reed
Mayor

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DEPARTMENT OF PROCUREMENT
Adam L. Smith, Esq., CPPO, CPPB, CPPM, CPP
Chief Procurement Officer
asmith@atlantaga.gov

February 19, 2015

Dear Potential Bidders:

Re: FC-7884, Hemphill Reservoir #1 Embankment Repair

Attached is one (1) copy of **Addendum Number 4**, which is hereby made a part of the above-referenced project.

For additional information, please contact Katherine Vernet, Esq., Contracting Officer, at (404) 330-6517 or by email at kvernet@atlantaga.gov.

Sincerely,

A handwritten signature in cursive script that reads "Adam L. Smith".

Adam L. Smith

ALS/kv

ADDENDUM NO. 4

This Addendum No. 4 forms a part of the Request for Proposal and modifies the original solicitation package and any prior addenda as noted below and is issued to incorporate the following:

- **Questions and Answers:**
A total of twenty-nine (29) questions are attached hereto as Attachment No. 1.
- **Geotechnical Report:**
A Geotechnical report is attached hereto as Attachment No. 2.
- **Replacement of Part A, Section 01010, Summary of Work:**
Section 01010, Summary of Work is hereby removed and replaced with revised section 01010 (dated 2/19/15) attached hereto as Attachment No. 3.
- **Replacement of Part A, Section 01014, Work Sequence:**
Section 01014, Work Sequence is hereby removed and replaced with revised section 01014 (dated 2/19/15) attached hereto as Attachment No. 4.
- **Replacement of Part A, Section 01410, Testing Laboratory Services:**
Section 01410, Testing Laboratory Services is hereby removed and replaced with revised section 01410 (dated 2/19/15) attached hereto as Attachment No. 5.
- **Replacement of Part A, Section 02460, Geotechnical Instrumentation and Monitoring:**
Section 02460, Geotechnical Instrumentation and Monitoring is hereby removed and replaced with revised section 02460 (dated 2/19/15) attached hereto as Attachment No. 6.
- **Replacement of Part A, Section 02575, Removing and Replacing Pavement:**
Section 02575, Removing and Replacing Pavement is hereby removed and replaced with revised section 02575 (dated 2/19/15) attached hereto as Attachment No. 7.
- **Replacement of Part A, Section 03300, Cast-in-Place Concrete:**
Section 03300, Cast-in-Place Concrete is hereby removed and replaced with revised section 03300 (dated 2/19/15) attached hereto as Attachment No. 8.
- **Replacement of Part B, Section 01060, Regulatory Requirements:**
Section 01060, Regulatory Requirements is hereby removed and replaced with revised section 001060 (dated 2/19/15) attached hereto as Attachment No. 9.
- **Replacement of Part B, Section 01200, Measurement and Payment:**
Section 01200, Measurement and Payment is hereby removed and replaced with revised section 01200 (dated 2/19/15) attached hereto as Attachment No. 10.
- **Replacement of Exhibit D, Bid Schedule:**
Exhibit D, Bid Schedule is hereby removed and replaced with revised Exhibit D (dated 2/19/15) attached hereto as Attachment No. 11.

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The Proposal due date HAS NOT been modified and Proposals are due on Wednesday, February 25, 2015 and should be time stamped in no later than 2:00 P.M. EST and delivered to the address listed below:

Adam L. Smith, Esq., CPPO, CPPB, CPPM, CPP
Chief Procurement Officer
Department of Procurement
55 Trinity Avenue, S. W.
City Hall South, Suite 1900
Atlanta, Georgia 30303

****All other pertinent information is to remain unchanged****

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Acknowledgment of Addendum No. 4

Proponents must sign below and return this form with Proposal response to the Department of Procurement.

Proponents must sign below and return this form with Proposal to the Department of Procurement, 55 Trinity Avenue, City Hall South, Suite 1900, Atlanta, Georgia 30303 as acknowledgment of receipt of this Addendum.

This is to acknowledge receipt of **FC-7884, Hemphill Reservoir #1 Embankment Repair, Addendum No. 4**, on this _____ day of _____, 20____.

Legal Company Name of Bidder

Signature of Authorized Representative

Printed Name

Title

Date

Attachment No. 1

Questions and Answers

FC-7884, Hemphill Reservoir #1 Embankment Repair
Questions and Answers

1. It will need a lot of Dirt hauled in to complete the grading, due to it being a top cover and a Dam project does it need to be structural fill?

Answer: See General Notes on sheet C-4 for embankment material.

2. Since it is a Dam what are the compaction requirements, and will it need to be benched in?

Answer: See sheet C-4 and C-5.1 in the plans.

3. Is topsoil required to be hauled in or does the existing area to be repaired have sufficient top soil for reuse?

Answer: Contractor shall determine this.

4. The Fabri-form specified is to be filled with grout, What PSI is specified?

Answer: See specification Section 02724, Fabriform Repair.

5. On the Bid form Part A there is a Bid item 1. Which states: Furnish all products, Materials, and equipment and Labor to complete and put into operation the repairs including all work shown on the drawings. Under the allowances line item 2 E – is Specialty Contractor: Fabri-form. Is the Fabri-form to be paid under the base bid or the Allowances?

Answer: Fabriform repair, as called out specifically in the plans and as necessary to complete the Work, shall be included in the Lump Sum bid. Allowance Item 2E shall cover additional Fabriform Repair, as identified by the Engineer, not specifically called out in the plans or necessary to complete the Work.

6. Will the city Award both parts to the low Bidder, or will the Owner break up Part A, and Part B?

Answer: Part A and Park B will be awarded to one contractor.

7. Are we to furnish one bid bond for the two parts?

Answer: Only one bid bond is required for both parts.

8. Can you provide an Engineer's estimate for the Hemphill Reservoir #1 Embankment Repair?

Answer: No. An engineer's estimate cannot be provided for this project.

9. Will the City substantially reduce the Liquidated Damages provision of GC-55 of \$5,000 per calendar day; this level of Liquidated Damages is very dissuasive in deciding if many firms will bid, especially since many plant related tasks are subject to the Engineer approvals and area water requirements will govern construction activities.

Answer: Liquidated Damages for delay in Substantial Completion and Final Completion will be reduced to \$1500/day and \$500/day, respectively.

10. Will the City establish that the contractor can rely on the lowering of the reservoir as a basis of its bid? There is a considerable cost difference in performing this work with a full reservoir pool.

Answer: The reservoir is currently significantly below full pool elevation. Any lowering of the current water level, performed with the Engineer's approval, desired to complete the Work shall be included in the Contractor's bid.

11. Will the City extend the date for questions until a reasonable time after the site visit which has not been held?

Answer: The date for questions was extended to give a reasonable time for questions to be asked.

12. Exhibit G, Statement of Qualifications: Please remove the time limitation (past 5 years and 10 years) on demonstrating relevant project experience for dam construction/repairs and construction

FC-7884, Hemphill Reservoir #1 Embankment Repair
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of large diameter water line for the contractor, project manager and project superintendent. This will allow contractors with experience the opportunity to provide its project history and experience that has been acquired earlier than the last five years and 10 years. This has greater significance in the area of dam construction which is not a frequent requirement in the local construction market.

Answer: The time limitation for relevant project experience will not be eliminated or modified.

13. Please provide the daily plant power and chemical costs associated with potential flow diversion activities of Section 01014, Article 3.05.

Answer: Technical Specification Part A – Embankment Repair, Section 01014, Article 3.04 & 3.05 will be removed from the contract documents. See revised Section.

14. Please provide description of flow diversion operation anticipated.

Answer: Technical Specification Part A – Embankment Repair, Section 01014, Article 3.04 & 3.05 will be removed from the contract documents. See revised Section. No flow diversion operation is anticipated to complete the work in Part A – Embankment Repair.

15. It is my understanding that the project engineer will select the testing and special inspections firm for the project and assign them to the contractor. Is that correct? If so, has the engineer selected a testing firm or not? If not, can we bid the testing and special inspections? We are Georgia Safe Dam Engineers.

Answer: The City will be procuring a geotechnical engineer for soil inspection and testing services for the services required in Part A under a separate contract. The Engineer will not be selecting the soil testing and special inspections firm for the contractor. Instead, the engineer will be self-performing the work. Soil testing and inspections for Part B shall be included in the Lump Sum Price.

16. I wanted to check and see if the quality control (soil testing) was being bid separately. I have spoken with a few of the bidding contractors and they seem to think that the city will be handling this.

Answer: All soil testing and inspection for Part A is to be performed by a geotechnical engineer procured under a separate contract. All other testing required by the contract documents, with the materials testing required by Section 03300 being one example, is the responsibility of the Contractor and shall be included in the Lump Sum Price.

17. Please refer to Drawing C- 4....General Notes 1..."Contractor shall perform all work "in the dry." Contractor may lower reservoir level if approval by the City of Atlanta is obtained, or construct cofferdams or other methods as required."

- a. As we prepare our bid should we base our pricing on having approval to lower the reservoir?

Answer: Yes; it's been confirmed that EPD will allow lowering of the current water level for construction.

- b. If the reservoir can be lowered, what are the restrictions regarding that procedure?

Answer: Contractor shall limit the drawdown rate to 500 gpm.

- c. Is there a length of time that the reservoir can be lowered?

Answer: The reservoir water level can be lowered as long as needed for construction.

- d. Can the reservoir be lowered to an elevation sufficient to allow the work to be done in the dry?

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Answer: Contractor needs to determine this based on the information in the plans.

- e. If the reservoir cannot be lowered what are the requirements for the temporary cofferdam?

Answer: See Specification Sections 02140, Dewatering and 02200, Earthwork.

- f. Will there be any restriction on the type of material that is used to construct the temporary cofferdam?

Answer: See Specification Sections 02140, Dewatering and 02200, Earthwork.

18. It was stated at the site walk that the Parts A & B will be awarded as one contract. Please revise the bid form include a lump sum total for parts A & B.

Answer: This is already included on Page 4 of the Bid Form.

19. Specification Sections 01200 and 01400 state that all geotechnical testing is to be provided and paid for by the contractor. Section 02200 states that soil testing will be paid for from the "Specialty Contractors" allowance. However, it was stated at the pre-bid meeting that the testing would be paid for under allowance item 2B. Please clarify who is paying for material testing.

Answer: All soil testing and inspection for Part A is to be performed by a geotechnical engineer procured under a separate contract by the City. All other testing required by the contract documents, with the materials testing required by Section 03300 being one example, is the responsibility of the Contractor and shall be included in the Lump Sum Price. Section 02200 for Part A has been revised to reflect this approach.

20. Section 02460 paragraph 1.01.B states that the all work related to the installation of the geotechnical instrumentation and monitoring will be paid thru a Specialty Contractor Allowance. Please clarify if this is correct and add to the bid form if alterations are necessary.

Answer: Geotechnical Instrumentation will be installed by the Contactor as part of the Lump Sum Price. Installation will be witnessed and documented by the Engineer, and monitoring of instruments will be performed by the Engineer. Section 02460 for Part A has been revised to reflect this approach.

21. Please clarify how long the raw water main can be taken out of service for the installation of the check valve vaults.

Answer: Shutdown time will vary based on the current demand, time of year and day of the week. We will be able to shut individual mains down for at least 12 hours at a time. Contractor will need to work closely with the plant superintendent to coordinate shutdown.

22. Since the project goals are for 30% of the work to be subcontracted to AABE & FBE firms, can the qualifications of subcontractors be used to meet the minimum experience qualifications for the team?

Answer: The definition of Contractor as given in the General Conditions is "any firm, partnership, corporation, joint venture, LLC or any combination thereof who enters into a contractual Agreement with the City. This excludes Subcontractors/Sub-consultants." Only the experience of the Contractor, as defined above, can count towards the minimum qualifications. So the answer to the question would be no, subconsultant experience cannot be used to meet Contractor minimum experience requirements.

23. In the Summary of Work - Section 1.01 Description: Line item #6 states: Pavement repair Associated with installation of the siphon or damaged during construction, and other Pavement

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repairs as directed by the engineer. This wording is fairly broad. Can this be reworded to clarify/explain the extent of the repairs we will be responsible for?

Answer: Language has been clarified. See revised Part A – Embankment Repair Specifications Section 01010 Summary of Work.

24. In the Summary of Work - Line item # 7: Same as above.

Answer: Language has been clarified. See revised Part A – Embankment Repair Specifications Section 01010 Summary of Work.

25. Concrete Specifications 03300 2.01 A 1 Calls for type II cement and 4 States "type I cement is NOT PERMITTED". Type II concrete is really a blend of type I and type III cement and is for mass pours. It is also very difficult to get. The concrete structures on this project are pretty standard - pipe encasement, footings, walls and slabs. Since Type II is so difficult to get, can we use Type I cement?

Answer: Use of Type I cement for Part B Work will not be permitted.

26. Specifications 02140 Dewatering 1.01 C refers to a subsurface report by CERM, is a copy of that report available for our review?

Answer: Yes; this report will be made a part of the Contract Documents.

27. Check Valve Installation, Part B – The plan shows temporary sheet pile shoring along the north and south boundaries of the excavation. The tie backs required could easily go beneath Howell Mill Road to the north or beneath the reservoir perimeter access road and dam to the south. Will we be allowed to tie back into these areas? Will the contractor be given a waiver relieving us of responsibility?

Answer: No. Excavation support system shall be designed so that it doesn't impact or encroach upon public right-of-way or the reservoir dam. The Contractor shall have the option of using other methods of shoring if deemed appropriate or necessary.

28. Check Valve Installation, Part B – There is no painting specification for inside the valve vault (pipe, fittings, etc.). Is painting required?

Answer: The intent was to use standard coatings for pipes, fittings and valves, or as specified in the technical specifications. No additional painting is required by the contract documents.

29. Please advise if the existing power pole at Reservoir #2 will be relocated and made safe to work around by GA Power, and whether this will be paid for under the Owner's Allowance.

Answer: Contractor shall work with utility owner to remove guy wires, provide temporary support, and replace guy wires as called out in the Plans on Sheets CO1.1 and CS1.1. All costs associated with removal and replacement of guy wires and temporary support shall be borne by the Contractor, and all cost shall be included in the Lump Sum bid.

Attachment No. 2

Geotechnical Report

**Report of Subsurface Exploration and
Geotechnical Engineering Evaluation
Hemphill Check Valve Vault
Atlanta, Georgia
CERM Project No. 111152-012**



C E R M

CORPORATE ENVIRONMENTAL RISK MANAGEMENT
Client-Centered Solutions

October 11, 2012

CH2M HILL, Inc./William-Russell and Johnson, Inc. a JOINT VENTURE
1000 Abernathy Road, Suite 1600
Atlanta, GA 30328-5621

Attention: Mr. Chris Carr, P.E.
Project Manager

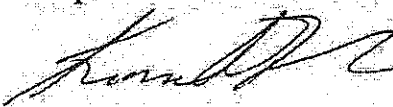
Subject: **Report of Subsurface Exploration and
Geotechnical Engineering Evaluation**
Hemphill Check Valve Vault
Atlanta, Georgia
CERM Project No. 111152-012

Dear Mr. Carr:

Corporate Environmental Risk Management, LLC is pleased to provide this report of our subsurface exploration and geotechnical engineering evaluation for the referenced project. The field study and this report were accomplished in general accordance with CERM Proposal No. 11p-0812-17, dated August 21, 2012, and Services Agreement Task Order No. 2012-002.

The following report will present a brief summary of our pertinent findings and recommendations followed by our understanding of the proposed construction, methods of exploration employed, site and subsurface conditions encountered, and conclusions and recommendations regarding the geotechnical aspects of the project. Should you have any question regarding items discussed in this report, please do not hesitate to contact the undersigned.

Sincerely,
Corporate Environmental Risk Management, LLC


Kenneth A. Fluker, P.E.
Principal Engineer



2296 Henderson Mill Road
Suite 200
Atlanta, Georgia 30345

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APPENDIX

Soil Test Boring Procedures
 Correlation with Standard Penetration Test Results
 Figure 1: Vicinity Map
 Figure 2: Site and Boring Location Plan
 Figure 3: Groundwater Level Observation Well Diagram
 Soil Classification Chart
 Soil Test Boring Records (3)

1.0 SUMMARY

The following is a brief summary of our pertinent findings and recommendations. The reader is referred to the remaining text of this report for elaboration on these items.

1. The property appears generally suitable for the proposed construction, from a geotechnical standpoint.
2. General subsurface conditions consist of 3 inches of topsoil over previously placed fill extending 5½ to 8 feet below the existing ground surface. Residuum is present below the previously placed fill and extends to the maximum exploration depth of 15 feet below existing ground surface. The stabilized groundwater level is approximately 8 feet below the existing ground surface.
3. Groundwater control using dewatering techniques will be necessary in order to construct the vaults. The ground level should be lowered 3 feet below the lowest excavation elevation to minimize the impact of groundwater on the subgrade. The check valve vaults should be designed to resist hydrostatic uplift forces. In addition, the nearby structures should be monitored for settlement as the groundwater level is lowered.
4. The soil underlying the proposed vaults is suitable for supporting the proposed check valve vaults. The maximum allowable bearing pressure of the soil is 1,000 psf.
5. The on-site soils minus any debris are visually suitable for reuse as structural fill provided that they are moisture conditioned.

2.0 PROPOSED CONSTRUCTION

The project consists of the design of two check valve vaults for three near parallel water lines at the Hemphill Settled Solids Facility in Atlanta, Georgia. The site location is shown on the Vicinity Map, Figure 1, in the Appendix. The water lines consist of a 30-inch diameter pipe, a 36-inch diameter pipe, and a 48-inch diameter pipe. The check valves for the 36- and 48-inch pipes will be housed in one vault measuring about 20 feet by about 27 feet in plan dimensions. The check valve for the 30 inch pipe will measure about 10 feet by 20 feet in plan dimensions. The crown of the pipes was initially reported to be about 5 feet below the existing ground surface. Therefore, the bottoms of the vaults were expected to be located about 8 to 10 feet below the existing ground surface. Two locations are under consideration for the vault proposed for the 30-inch line.

Information provided at the time of this report suggests that bottom of the vault for the 36- and 48-inch diameter pipes will bear about 13½ feet below the existing ground surface. The bottom of the vault for the 30-inch diameter pipe will bear about 16 feet below the existing ground surface.

No other details of the proposed construction were available at the time this report was prepared.

3.0 METHODS OF EXPLORATION

To evaluate the subsurface conditions, the property was explored by a combination of a visual site reconnaissance and drilling three soil test borings to a depth of 15 feet below the existing grade. The soil test borings were located in the field by measuring distances and estimating directions from identifiable site features. Therefore, their locations as shown on the Site and Boring Location Plan, Figure 2, in the Appendix should be considered approximate.

Two of the borings (B-1 and B-3) were converted to groundwater level observation wells. A typical diagram of the groundwater level observation wells is provided on Figure 3 in the Appendix.

The borings were advanced by twisting continuous hollow stem auger flights into the ground. At selected intervals, Standard Penetration Resistance Testing (SPT) was performed in general accordance with ASTM standard D-1586, and soil samples were collected for visual classification. The results of the penetration tests, when properly evaluated, provide an indication of the relative consistency of the soil being sampled, the potential for difficult excavation, and the soil's ability to support loads. A more detailed description of the drilling and sampling process is included in the Appendix of this report.

Soil samples recovered during the drilling process were returned to the office where they were classified in general accordance with the Unified Soil Classification System (USCS). Detailed descriptions of the materials encountered at each boring location, along with a graphical representation of the Standard Penetration Test results, are shown on the Soil Boring Records in the Appendix. Elevations on the Boring Records were interpolated from the topographical contours on the plan provided to us and should be considered approximate.

4.0 SITE DESCRIPTION, GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Site Description

The site is located within the Hemphill Settled Solids Facility at 1350 Howell Mill Road in Atlanta, Georgia. The site is located between the northeast side of a reservoir and the southwest side Howell Mill Road. The topography slopes down to the northeast. The vertical relief across the site is approximately 4 feet. Vegetation consists of grass. A one story brick building and a brick vault bound the southern end of the site.

4.2 Geology

The site is located in the Piedmont Physiographic Province of Georgia. The residual soils in the Piedmont are the result of the chemical and physical weathering of the underlying parent rock. The weathering profile usually results in fine grained clayey silts and silty clays near the surface, where weathering is more advanced. With depth, sandy silts and silty sands are found, often containing mica. Below the residual soils, partially weathered rock is often found as a transition above

relatively unweathered rock. In local practice, partially weathered rock is arbitrarily defined as residual soils with Standard Penetration Resistances in excess of 100 blows per foot (50 blows per 6 inches), and which can be penetrated by a power auger.

4.3 Subsurface Conditions

4.3.1 Topsoil

All borings encountered approximately 3 inches of topsoil.

4.3.2 Previously Placed Fill

All of the borings encountered previously placed fill beneath the topsoil to depths extending 5½ to 8 feet below the existing ground surface. The existing fill was classified as sandy silt, clayey silt, and silty sand with Standard Penetration Test (SPT) values of ranging between 3 and 20 blows per foot (bpf). Rock fragments and charred wood fragments were encountered in a few samples. The presence of rock or debris fragments tends to inflate SPT values. Based on the SPT results, the fill represented by these samples would be considered poorly to moderately compacted.

4.3.3 Residuum

Residuum was encountered below the existing fill in all borings. The residuum was classified as sandy silt, clayey silt, and silty sand and was of low consistency and relative density. Standard Penetration Test results ranged from 3 to 14 blows per foot, with 3 to 7 bpf being typical.

4.3.4 Groundwater

At the time of drilling, groundwater was encountered 11 feet below the existing ground surface in boring B-2. Following the conversion of borings B-1 and B-3 to groundwater level observation wells, the water levels were about 8 and 10 feet below the ground surface in wells 1 and 3, respectively. The stabilized groundwater levels in the wells were measured about 8 feet below the existing ground surface. Groundwater fluctuations of 5 feet or more are common in this geology.

The conditions described in the preceding paragraphs, and those shown in the Appendix, have been based on interpolation of the results of the previously described data using generally accepted principles and practices of geotechnical engineering. However, conditions in this geology may vary intermediate of the tested locations, and even more so on previously developed property.

Although individual soil test borings are representative of the subsurface conditions at the precise boring locations on the day drilled, they are not necessarily indicative of the subsurface conditions at

other locations or other times. The nature and extent of variation between the borings may not become evident until the course of construction. If such variations are then noted, it will be necessary to re-evaluate the recommendations of this report after on-site observation of the conditions.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on the data gathered during this exploration, our understanding of the proposed construction, our experience with similar site and subsurface conditions and generally accepted principles and practices of geotechnical engineering. Should the proposed construction change significantly from that described in this report, we request that we be advised so that we may amend these recommendations accordingly. This report and the conclusions and recommendations provided herein are provided exclusively for the use of CH2M HILL, Inc./William-Russell and Johnson, Inc. a JOINT VENTURE, Inc. and are intended solely for design of the referenced project.

5.1 Site Preparation

As an initial step in site preparation, all unwanted vegetation should be removed, and organic topsoil stripped.

All areas to receive fill should be evaluated prior to fill placement. The approval process should include proofrolling the subgrade with a fully loaded tandem axle dump truck (20 tons) during a period of dry weather and under the observation of the geotechnical engineer. Any areas which "pump" or "rut" excessively under the weight of the proofrolling vehicle should be further evaluated, and may require undercutting or other remediation. The proofrolling can occasionally detect pits where stumps or other debris may have been buried, or other areas where weak surface conditions exist.

5.2 Earthwork

The existing soils on the property visually appear suitable for reuse as structural fill with the exception of the charred wood fragments encountered in boring B-3 at a depth of 3 to 5 feet below the existing ground surface. Moisture conditioning will be necessary due to wet soils encountered in the borings.

All structural fill should be compacted to at least 95 percent of the soil's standard Proctor maximum dry density, as determined by ASTM standard D-698. Structural fill should be free of organic material, have a plasticity index (PI) less than 20 and contain rock sizes no larger than 4 inches.

Excavations can be accomplished using conventional heavy earthmoving equipment such as dozer assisted pans, and excavations of rock and partially weathered rock are not anticipated.

5.3 Groundwater Control

Construction of the check valve vaults will occur below groundwater. Therefore dewatering techniques will be necessary to allow construction. A sump and pump arrangement may not be practical for the groundwater conditions encountered at this site. The contractor is ultimately responsible for determining the method of dewatering. The dewatering method chosen will have a significant impact the success of this project.

The dewatering system should be established and operating well in advance of excavation. The groundwater should be lowered and remain 3 feet or more below the lowest elevation of the excavation. The dewatering system should remain functional 24 hours a day, 7 days a week until the vaults are constructed and completely backfilled. The effectiveness of the dewatering system may be monitored with piezometers, and any additional well points added, if necessary.

The check valve vaults should be designed to resist hydrostatic uplift forces once the dewatering system is disconnected. This resistance may be provided by the weight of concrete or helical anchors.

5.4 Foundations

The proposed vaults may bear on the residual soil using an allowable bearing pressure of 1000 psf. The recommended bearing pressure is based on correlations with the Standard Penetration Test results. These correlations imply that a maximum total settlement of one inch is possible and a maximum differential settlement of half the total settlement is possible. However, any settlement is expected to be negligible because the allowable bearing pressure is less than the overburden pressures at the proposed bearing depths. In addition, the actual bearing pressures of the vaults are expected to be much less than the allowable bearing pressure provided.

As with any construction, all foundation excavations should be evaluated by a geotechnical engineer, who will verify that the design bearing pressure is available intermediate of boring locations, and that foundations are not immediately underlain by worse conditions. If the engineer finds localized conditions of weaker or organic soil below an individual footing, it may be undercut depending upon the actual conditions found.

5.5 Temporary Excavations

The construction of the vaults will require temporary excavations that are either sloped or braced for safety. If temporary slopes are used, they should be constructed no steeper than 1.5H:1V. Excavated soils should be stockpiled such that the toe of the stockpile is located no closer than 1.5 times the depth of the excavation from the surface edge of the excavation. More strict Occupational Safety Hazard Administration (OSHA) regulations may apply, and should be followed. However, if the

regulations are lenient with regard to the recommendations stated previously, this office should be notified to evaluate the situation.

Shoring or Bracing may be necessary if sufficient space is not available to safely slope the sides of the excavations. The shoring or bracing system should be designed by a GA registered professional engineer.

5.6 Lateral Earth Pressures

Lateral earth pressures imposed on a retaining wall are a function of the soil properties, the inclination of the backfill behind the retaining wall, any surcharge loads applied behind the wall and the amount of deflection the wall system can undergo. Lateral earth pressures developed from the "active" condition are applicable for design of temporary or permanent free-standing retaining walls, if adequate wall movement can occur to fully mobilize the shear strength of the retained soil. Permanent laterally restrained walls, such as basement walls, should be designed for pressures using the full "at-rest" case. Based on the conditions found, the following equivalent fluid pressures for submerged conditions are recommended, assuming a horizontal backfill configuration, no surcharge loads, and "typical" Piedmont soils used for backfill.

Active Pressure	82 pcf
At Rest Pressure	92 pcf

In the case of backfill sloping down to the wall, the following equivalent fluid pressures for submerged conditions are recommended, assuming up to a 3.5(H):1(V) sloping backfill configuration; no surcharge loads, and "typical" Piedmont soils used for backfill.

Active Pressure	86 pcf
At Rest Pressure	102 pcf

Heavy compaction equipment should not be used to compact backfill immediately behind any retaining wall, unless the wall is designed for the increased pressure. Retaining wall backfill should be compacted to at least 95% of the soil's standard Proctor maximum dry density; therefore hand operated compaction equipment will be necessary in these areas.

Lateral loads can be resisted by passive pressures against the face of the foundation or sliding resistance on the base of the footing. An allowable equivalent fluid pressure of 75 pcf is recommended for passive resistance under submerged conditions and includes a factor of safety of about 2. A factor of safety of at least 2 is recommended due to the large deflections required to mobilize full passive resistance. Additional resistance to movement can be gained by developing sliding friction on the base of the footing and an allowable friction factor of 0.4 may be used. This includes a factor of safety of about 1.5. Wall footings in areas occasionally submerged should be designed using the 75 pcf criteria for passive resistance.

6.0 QUALIFICATIONS OF RECOMMENDATIONS

This evaluation of the geotechnical aspects of the proposed design and construction has been based on our understanding of the project and the data obtained during this study. The general subsurface conditions used in our evaluation were based on interpolation of the subsurface data between the borings. Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions will differ between boring locations, that conditions are not as anticipated by the designers, or that the construction process has modified the soil conditions. Therefore, experienced soil engineers and technicians should evaluate earthwork and foundation construction to verify that the conditions anticipated in design actually exist. Otherwise, we assume no responsibility for construction compliance with the design concepts, specifications or recommendations.

The recommendations contained in this report have been developed on the basis of the previously described project characteristics and subsurface conditions. If project criteria change, we should be permitted to determine if the recommendations should be modified. The findings of such a review will be presented in a supplemental report. Even after completion of a subsurface study, the nature and extent of variation between borings may not become evident until the course of construction. If such variations then become evident, it will be necessary to re-evaluate the recommendations of this report after on-site observations of the conditions.

These professional services have been performed, the findings derived, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all warranties either expressed or implied. This company is not responsible for the conclusions, opinions or recommendations of others based on these data.

APPENDIX A

SOIL TEST BORING PROCEDURES (ASTM D 1586 and 1587)

The soil test borings were advanced by twisting continuous auger flights into the ground. At selected intervals, soil samples were obtained by driving a standard 1.4 inch I.D., 2.0 inch O.D., split tube sampler into the ground. The sampler was initially seated six inches to penetrate any loose cuttings created in the boring process. The sampler is then driven an additional 12 inches by blows of a 140-pound "hammer" falling 30 inches. The number of blows required to drive the sampler the final foot is designated the Standard Penetration Resistance.

Relatively undisturbed samples were secured using a three-inch diameter, thin-wall steel tube sampler. In this sampling procedure, the borehole is advanced to the desired level, and the tube is lowered to the bottom of the boring. It is then pushed about two feet into the undisturbed soil in one continuous stroke. The sample and tube is retrieved from the borehole and detached from the drill string.

The samples recovered were sealed against moisture loss and were transported to the office where they were classified by an engineer in general accordance with the Unified Soil Classification System (USCS).

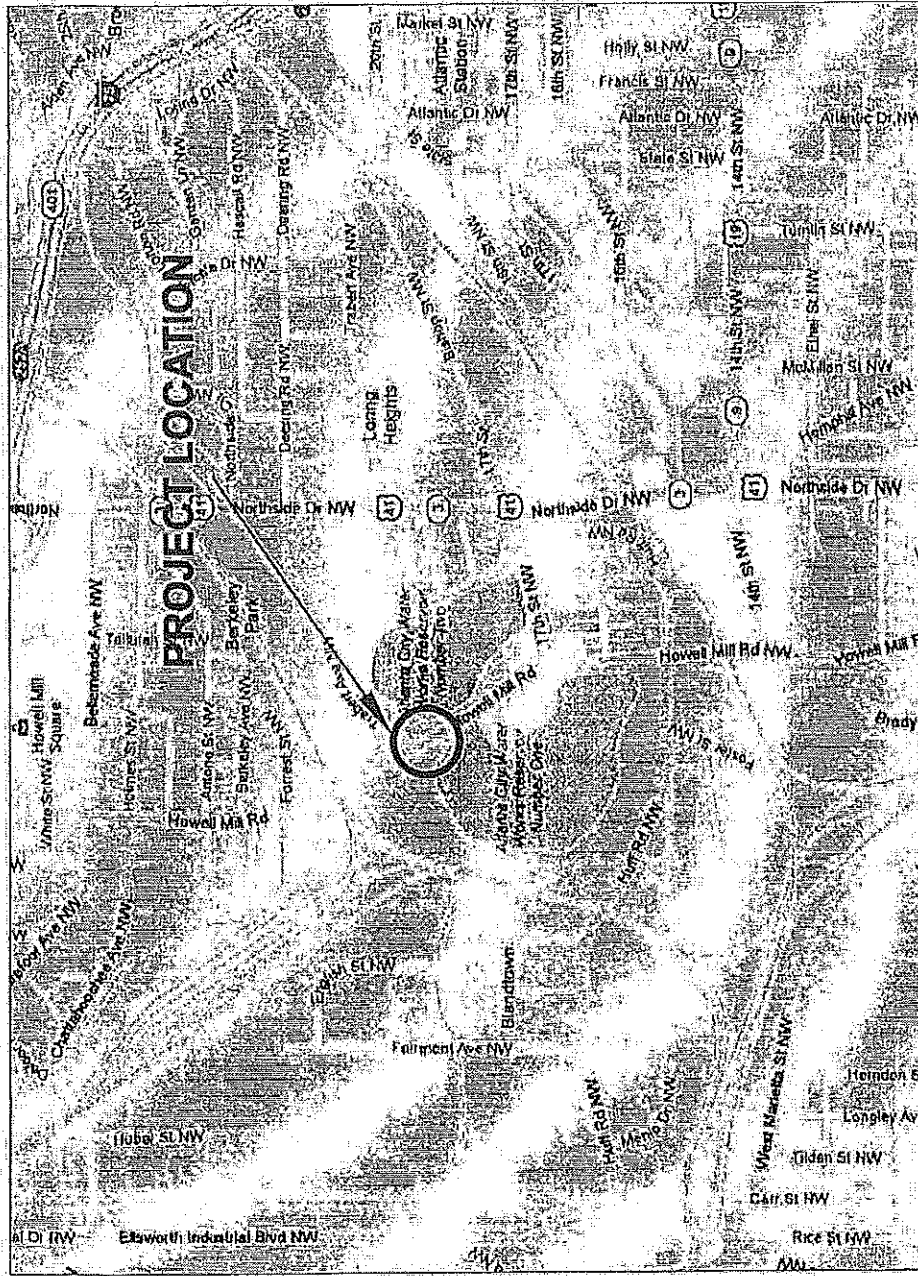
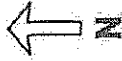
**CORRELATION OF STANDARD PENETRATION RESISTANCE
WITH RELATIVE DENSITY AND CONSISTENCY**

Sand and Gravel

Standard Penetration Resistance Blows / Foot	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
30 - 50	Dense
Over 50	Very Dense

Silt and Clay

Standard Penetration Resistance Blows / Foot	Relative Consistency
0 - 1	Very Soft
2 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
Over 50	Very Hard



NOT TO SCALE

PROJECT LOCATION VICINITY MAP

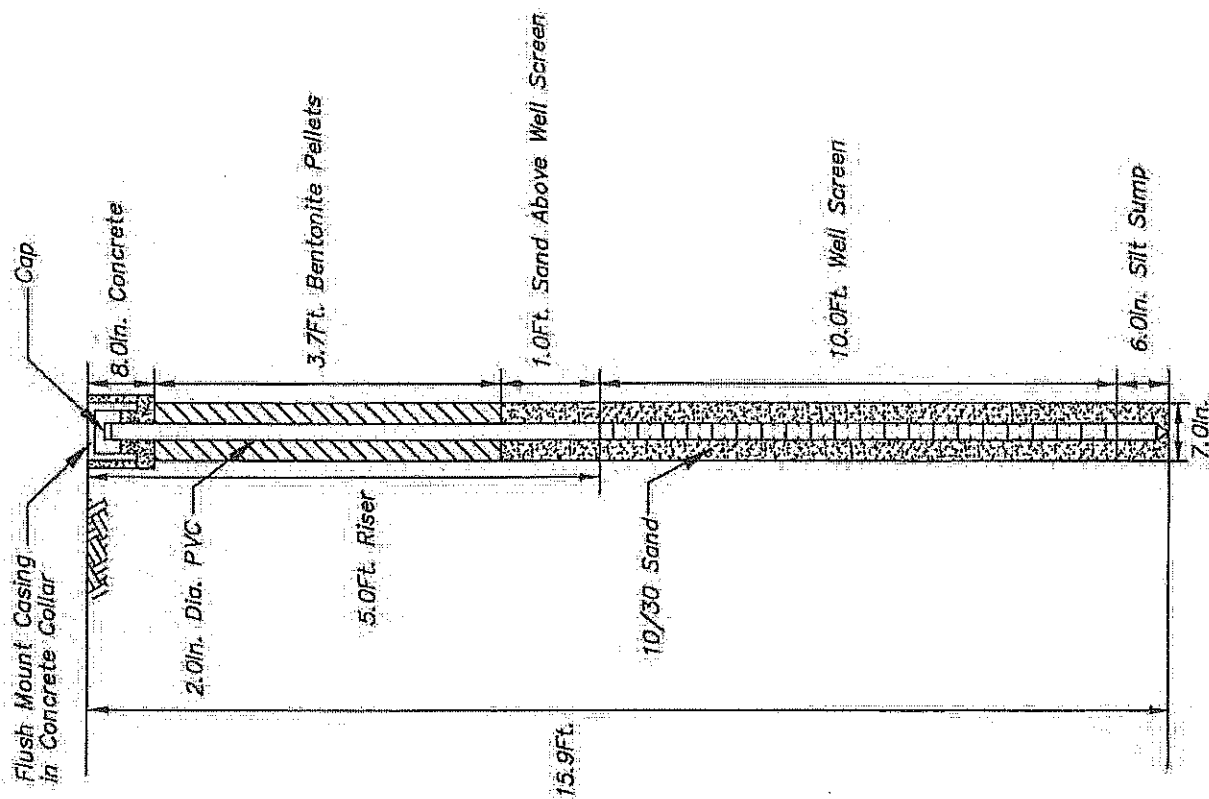
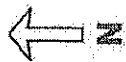
PROJECT: HEMPHILL CHECK VALVE VAULT
ATLANTA, GA



PROJECT NO:
111152-012

DATE:
10/09/2012

FIGURE:
1



NOT TO SCALE





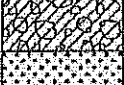
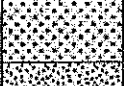



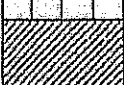






GROUND WATER LEVEL OBSERVATION WELL DIAGRAM

PROJECT: HEMPHILL CHECK VALVE VAULT
ATLANTA, GA

PROJECT NO: 111152-012
DATE: 10/09/2012
FIGURE: 3

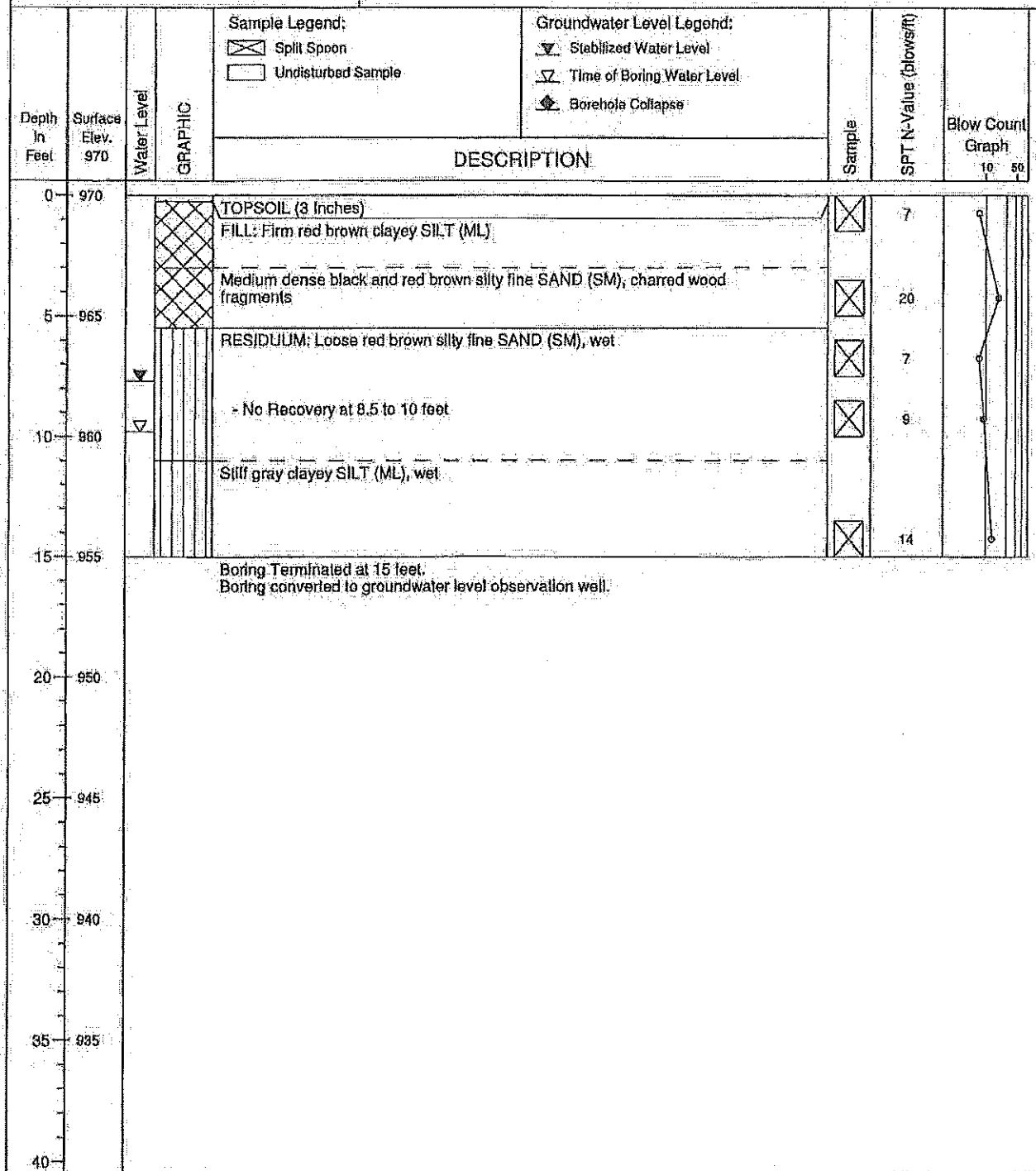


SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
ALLUVIUM				PT	ALLUVIUM, PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL				FILL	MATERIAL PLACED BY MAN

Depth in Feet	Surface Elev. 970	Water Level	GRAPHIC	Sample Legend:	Groundwater Level Legend:	Sample	SPT N-Value (blows/ft)	Blow Count Graph
				<div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> Spill Spoon <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background: white;"></div> Undisturbed Sample	<div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background: white; position: relative;"><div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-size: 10px;">▽</div></div> Stabilized Water Level <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background: white; position: relative;"><div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-size: 10px;">▽</div></div> Time of Boring Water Level <div style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background: white; position: relative;"><div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-size: 10px;">⬇</div></div> Borehole Collapse			
DESCRIPTION								
0	970			TOPSOIL (3 Inches) FILL: Stiff red brown fine sandy SILT (ML) Soft brown fine sandy SILT (ML), slightly micaceous		X	9	
5	965			RESIDUUM: Soft red brown clayey SILT (ML), wet		X	8	
		▽				X	4	
10	960			Soft brown fine sandy SILT (ML), micaceous, wet		X	3	
15	955					X	8	
Boring Terminated at 15 feet. Boring converted to groundwater level observation well.								
20	950							
25	945							
30	940							
35	935							
40								

C E R M



Attachment No. 3

Section 01010, Summary of Work

**SECTION 01010
SUMMARY OF WORK**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Definition: The Work is defined per General Conditions Section GC-3.
- B. Summary: Major areas of the Work for Part A of the project consist of, but are not limited to, the following items:
1. Repair/regrading to the embankment of Reservoir #1
 2. Installation of 20" DIP siphon in Reservoir #1.
- C. The work to be done under this contract, Hemphill Reservoir #1 Embankment Repairs, includes, but is not necessarily limited to, the modification/demolition/construction of the following:
1. Repair and regrading of Reservoir #1 north-eastern dam section embankment
 2. Removal and replacement of storm drainage manholes and inlets as noted on the Drawings.
 3. Removal of a portion of existing fencing and installation of new fencing as shown on the plans.
 4. Installation of 20" DIP siphon and control valve thru Reservoir #1 embankment, and associated piping to direct siphoned water to storm sewer system at bottom of embankment.
 5. Repair/replacement of Fabriform defects in Reservoir #1
 6. Pavement repair associated with installation of the siphon, and all other pavement damaged during construction of the project, as identified by the Engineer.
 7. Installation of new grassing and sod in construction area, and in any locations where existing grass is damaged by Contractor, as identified by the Engineer.
 8. Installation of monitoring wells and slope indicator equipment in embankment of Reservoir #1
 9. Disposal of all removed materials, unless specifically instructed otherwise by Engineer.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

+++ END OF SECTION 01010 +++

Attachment No. 4

Section 01014, Work Sequence

SECTION 01014 WORK SEQUENCE

PART 1 - GENERAL

1.01 SCOPE

- A. Work under this Section includes construction sequencing and provision of temporary facilities necessary to maintain the efficiency of the water treatment facilities during the performance of this Work. Pursuing the completion of this work may be restricted due to weather, seasonal demands for water treatment capacity, and/or work being performed by others.
- B. The Contractor shall coordinate the work to avoid any interference with normal operation of plant equipment and processes. The Contractor shall submit Work Plans and schedules for each proposed shut-down or restriction to normal operations. In addition, the Contractor shall comply with the following general requirements:
 - 1. Provide temporary pumps and other facilities necessary to meet the requirements of this Section.
 - 2. Notify the Engineer and Operations at least 48 hours prior to any piping or equipment modification or taking any component out of service.
 - 3. Penalties imposed on the City as a result of any bypass caused by the actions of the Contractor, his employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the City resulting directly or indirectly from the bypass.

1.02 SUBMITTALS

- A. In accordance with the General Conditions, the Contractor shall submit a detailed outage plan and time schedule for operations which will make it necessary to remove a tank, pipeline, channel, electrical circuit, equipment or structure from service. The schedule shall be coordinated with the construction schedule specified in the Special Conditions and shall meet the restrictions and conditions specified in this section. The detailed plan shall describe the length of time required to complete said operation and equipment which the Contractor shall provide in order to complete the work..
- B. Sequence Submittal: The sequence provided in Part 3 of this Section is offered as a suggestion to the Contractor. Submit a proposed sequence with appropriate times of starting and completion of tasks to Engineer for review.
- C. Alternate Sequences: Contractor may propose alternate sequences to that shown in Part 3 of this Section in an attempt to reduce the disruption of the operation of the existing facility or streamline the tasks of this Contract.

1.03 QUALITY ASSURANCE

- A. At least two weeks prior to any proposed activity which will require any portion of the plant to be removed from operation or require interruption of plant flow, the Contractor shall schedule a

meeting with Plant Operating Personnel and the Engineer. At this meeting, the Contractor shall present Contractor's detailed plan for the proposed operation for general discussion. The plan shall meet the minimum requirements below:

1. Plan shall be written outline form and presented in a format which shall show the progression of events in sequential and/or concurrent order of activity and the duration of each activity.
2. The written plan shall be supplemented by drawings, sketches, and details as required to show the logic of the plan and make it understandable.
3. The plan shall delineate the responsibilities of the Plant Operating Personnel and the Contractor, so as to eliminate any delay due to conflicting viewpoints upon implementation of the plan.
4. After discussion of the plan at the meeting, any changes agreed upon shall be incorporated into the plan and a copy of the plan and details shall be distributed to Plant Operating Personnel, the Engineer, and Contractor personnel at least one week prior to commencement of activities. On the day prior to commencement of activity a brief meeting of involved parties shall be convened. In this meeting the starting time and initial activity of Plant Operating Personnel and Contractor's personnel shall be agreed upon.

PART 2 – PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

The sequence of construction is outlined for the major items of Work required; no attempt has been made to describe every detail of the Project. The Contractor shall coordinate his work with the Plant Operating Personnel to minimize disruptions in plant operation. It shall be the Contractor's responsibility to insure that all existing facilities are protected and will not be damaged as a result of this construction. No settlement of existing facilities will be acceptable and all work shall be performed in a safe manner.

3.02 PROPOSED CONSTRUCTION SEQUENCE

The project shall be constructed in three (3) stages which will permit continuous operation of the facilities. The three stages of construction shall generally be performed in sequence, with overlap as required to maintain the treatment facilities in service. The 3 stages proposed are:

1. Step 1 - Preparatory
2. Step 2 - Modification to Existing Facilities
3. Step 3 - Cleanup and Final Restoration

The following list provides tasks, which generally fall within the defined steps.

Step 1 - Preparatory

The following steps may be performed simultaneously.

1. Contractor shall locate existing utilities
2. Contractor shall develop and submit for approval a Work Plan and schedule to accomplish the work shown on the contract drawings.

Step 2 – Modification to Existing Facilities

1. Modification to Reservoir #1 Dam
 - a. Install new fencing to secure reservoir site.
 - b. Regrade northeast face of dam
 - c. Install toe drain and trench drains
 - d. Install/modify piezometers
 - e. Install inclinometers
 - f. Modify existing drainage systems
 - g. Install siphon
 - h. Repair Fabriform

Step 3 – Cleanup and Final Restoration

3.03 COORDINATION WITH OTHER CONTRACTORS

The performance of the project shall be coordinated with other work going on at the same time on the project site. Certain portions of the project are required to be completed so that others can perform their work in a timely manner. The construction schedule prepared by the Contractor shall take in account the intermediate requirements depicted on the sequence diagram included.

+++ END OF SECTION 01014 +++

Attachment No. 5

Section 01410, Testing Laboratory
Services

SECTION 01410
TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes testing which the Engineer may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.
- B. This section also includes all testing required by the Owner to verify if work performed by the Contractor is in accordance with the requirements of these specifications, i.e., concrete strength and slump testing, soil compaction, etc.
- C. This section does not include testing required in various sections of these specifications to be performed by the manufacturer, i.e., testing of pipe. Where no testing requirements are described in various sections of these specifications, but the Engineer decides that testing is required to demonstrate compliance with material or performance standards, the Engineer may require testing to be performed under current pertinent standards for testing.
- D. An independent testing laboratory shall be selected by the Contractor approved by the Engineer and paid by the Contractor. The laboratory must be approved in writing by the Engineer before any testing services are performed.
- E. The Contractor shall pay directly for the services of the independent testing laboratory for all testing required under this Contract.
- F. Employment of the testing laboratory shall in no way relieve the Contractor of Contractor's obligation to perform work meeting the requirements of the Contract.
- G. Testing laboratory services will be required for, but not be limited to:
 - 1. Cement
 - 2. Aggregate
 - 3. Concrete
 - 4. Steel and Metals
 - 5. Welding
 - 6. Backfill and Compaction

7. Bituminous Pavement

1.02 LABORATORY DUTIES.

- A. Cooperate with the Owner, Engineer and Contractor.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials.
 - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of the Contract Documents.
- D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of services.
- E. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor with the following information included:
 - 1. Date issued
 - 2. Project title and number
 - 3. Testing laboratory name and address
 - 4. Name and signature of inspector
 - 5. Date of inspection or sampling
 - 6. Record of temperature and weather
 - 7. Date of test
 - 8. Identification of product and Specification section
 - 9. Location of sample or test in the Project
 - 10. Type of inspection or test
 - 11. Results of test and observations regarding compliance with the Contract Documents
 - 12. Interpretation of test results, when requested by the Engineer

- F. Perform additional services as required.
- G. The laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of the Contract Documents
 - 2. Approve or accept any portion of the Work
 - 3. Perform any duties of the Contractor.

1.03 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel; provide access to Work and/or manufacturer's requirements.
- B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.
- C. Furnish copies of mill test reports.
- D. Furnish required labor and facilities to:
 - 1. Provide access to Work to be tested;
 - 2. Obtain and handle samples at the site;
 - 3. Facilitate inspections and tests;
 - 4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.
- E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.
- F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.
- G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.04 QUALITY ASSURANCE

- A. Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.05 PRODUCT HANDLING

- A. Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.06 FURNISHING MATERIALS

- A. The Contractor shall be responsible for furnishing all materials necessary for testing.

1.07 CODE COMPLIANCE TESTING

- A. Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.08 CONTRACTOR'S CONVENIENCE TESTING

- A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.09 SCHEDULES FOR TESTING

A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.

2. Provide all required time within the construction schedule.

- B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

- C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back charged to the Contractor and shall not be borne by the Owner.

1.10 TAKING SPECIMENS

- A. Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

1.11 TRANSPORTING SAMPLES

- A. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.01 TESTS AND CERTIFICATIONS

- A. As a minimum, the following tests shall be performed and the following certification provided:
 - 1. Cement: Certified test results by cement manufacture or by independent laboratory shall be furnished as required by the Engineer.
 - 2. Aggregate and Mortar Sand: Certified test results by aggregate producer or by independent laboratory shall be furnished as required by the Engineer.
 - 3. Concrete:
 - a. Certified test results of all concrete in accordance with ASTM C31, C39 and C172.
 - b. Slump tests:
 - i. Perform slump tests on the job in accordance with ASTM standards.
 - ii. One (1) slump test shall be performed for each 25 cubic yards of concrete.
- B. Steel and Miscellaneous Metal: Reinforcing steel, structural steel and miscellaneous metal may be inspected visually on site by the Engineer.
- C. Welding: 1 percent of all structural welds during construction shall be inspected either visually or by an independent laboratory as required by the Engineer.
- D. Laboratory tests of compacted backfill shall be made in accordance with ASTM D698. In-place density tests shall be made in accordance with ASTM D1556 or D2922.

2/19/15

Compaction testing shall be required as specified in paragraph 1.02 of Section 02200 and paragraph 3.16 of Section 02225.

- E. Bituminous Concrete Pavement: Material testing for bituminous concrete shall be performed as directed by the Engineer, GDOT and the City of Atlanta Department of Public Works. Refer to Section 02575.

+++ END OF SECTION 01410 +++

Attachment No. 6

Section 02460, Geotechnical
Instrumentation and Monitoring

SECTION 02460
GEOTECHNICAL INSTRUMENTATION AND MONITORING

PART 1 - GENERAL

1.01 SCOPE

- A. The work specified in this Section includes furnishing, installing, monitoring and maintaining geotechnical instrumentation to monitor ground movements within the Hemphill Reservoir No. 1 dam section and to monitor groundwater levels as required under the Contract Documents.
 - 1. Geotechnical instrumentation consists of movement detection instruments and standpipe piezometers.
 - 2. These instruments are required to detect long term movement of the dam embankment and ground water levels within the dam embankment.
 - 3. Instrument monitoring is intended to provide early information to permit timely implementation of proper remedial measures, when and as required, to prevent damage to structures, facilities and utilities.
- B. All work under this section shall be performed by the Contractor and paid for by the contractor thru the Lump Sum Price.
- C. An approximate location for geotechnical instrumentation is shown on the Contract Drawings. The Engineer shall determine the exact location after the Contractor has achieved final grades at each location.
- D. The Engineer shall perform monitoring of geotechnical instrumentation. Take additional readings when instrumentation detects significant, anomalous or suddenly changing movement.
 - 1. Provide the instrumentation and take two baseline readings of each instrument to establish an initial value. Each of the two initial readings shall be taken at an interval of at least 24 hours. If the initial readings show a large variance, additional readings shall be taken to establish an initial reading.
 - 2. Movement detection and water readings shall be taken monthly for six (6) months following completion of dam construction and the refilling of the reservoir to normal operating level. Readings shall be provided to the City for evaluation. After six (6) months, the equipment shall be turned over to the City.
- E. The Engineer may perform supplemental monitoring of instruments at any time. The Contractor shall cooperate with such instrumentation monitoring activities as follows:
 - 1. Make probes, sensors and readout devices available as required.
 - 2. Coordinate employees' and subcontractors' activities to minimize interference.
- F. Calibrate instruments as recommended by the manufacturer. Replace or repair damaged or nonfunctional instruments within 48 hours to ensure uninterrupted reading schedules. When

nonfunctional or damaged instrument hardware or readout devices cannot be substituted within 48 hours, the Contractor shall furnish spares to replace the damaged or nonfunctional ones at no additional cost to the City.

1.02 DEFINITIONS

- A. Instrument monitoring includes, but is not limited to, the reading of the installed instruments at defined time intervals; performing calculations of height or elevation, including change of elevation from an initial elevation; plotting instrument readings; and submitting readings, calculations and plots at specified intervals.
- B. Survey control is defined as a system of precise field measurements of the types specified herein, utilizing acceptable methods, equipment and personnel for determination of elevations, coordinates and distances for performing construction operations.
- C. Inclometers (I): Instrument installed in drilled hole in soil to monitor lateral movements in and around the ground.
- D. Open Standpipe Piezometers: Consists of PVC pipe with a porous filter tip or slotted screen section to monitor ground water levels within the dam embankment.
- E. Review Level: Value of instrumentation readings at which the Engineer and Contractor jointly assess necessity of altering methods, rate or sequence of construction.
- F. Alert Level: Value of instrumentation readings at which the Engineer or City can order the Contractor to cease construction operations, make site and affected properties secure, and take necessary and agreed upon measures to mitigate unacceptable movements and to assure the safety of the work and the public.
- G. Baseline Reading: Value of instrumentation readings after dam construction to provide a baseline against which all subsequent readings are compared.

1.03 TOLERANCES

- A. Tolerances specified herein may be modified by the Engineer at any time, depending on location, construction progress, scheduling and efficiency of temporary Works, construction rates of movement, and other factors affecting of earth or structures that are subject to monitoring.
- B. Install open standpipe piezometers and inclinometers within 5 feet of the horizontal location shown on the Drawings. Install inclinometers within 0.5 foot of the vertical position shown on the Drawing or as directed by the Engineer.
- C. Install open standpipe piezometers and inclinometers within 2 degrees of vertical for the entire length.
- D. Notify the Engineer if actual field conditions prohibit installation at the location and elevations specified on the Drawings.
- E. Perform surveying to Third Order, Class 1 minimum accuracy.
- F. Establish the initial coordinates of each instrument installation to 0.1 foot.

1.04 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of the General Conditions of the Contract Documents.
- B. Qualifications: Submit personnel qualifications in accordance with the Contract Documents.
- C. Shop Drawings: Submit the Shop Drawings or items listed below, as prepared by qualified specialists submitted above.
 - 1. Instrument Installation Schedule: Submit the proposed schedule for installing instruments. The Engineer shall be informed 48 hours before installation procedures commence.
 - 2. Methods and equipment to be used for drilling and grouting, including manufacturer and model number of drill rigs, and method to be used for cleaning inside of casing or augers.
 - 3. Methods related to the installation and protection of surface settlement markers and points, and inclinometers and any other instruments.
 - 4. Method for overcoming buoyancy of instrumentation components during grouting.
 - 5. Method of sealing joints in pipes and inclinometer casing to prevent ingress of grout.
 - 6. Materials and mix portions for grout for installation of instruments.
 - 7. Method for conducting post-installation acceptance test.
 - 8. Following installation of the instruments, submit As-Built drawings showing the exact installed location, the instrument identification number, the instrument type, the installation date and time, the heading station, or open excavation or shaft excavation depth on the installation date and the anchor or tip elevation and instrument length, when and where applicable. Include details of installed instruments, accessories and protective measures including all dimensions and materials used. Show proposed locations if they differ from those indicated, and describe instrumentation components. Indicate methods of installation and maintenance for instrumentation systems.
 - 9. Forms for reporting instrumentation data. Samples showing proposed format for recording of readings, calculations and plots.
- D. Reports and Records: Engineer to provide reports of monitoring data to the City in accordance with the requirements of Article 3.06 herein.
- E. Product Data and Samples:
 - 1. Submit all applicable manufacturer's literature and drawings describing operation and maintenance procedures for each type of instrument including any probes, readout units and accessories associated with the instrument.
 - 2. Certificates: For each instrument to be installed submit, as applicable, a certificate issued by the instrument's manufacturer stating that the manufacturer has inspected and tested each

instrument before it leaves the factory to see that the instrument is working correctly and has no defects or missing parts.

3. Manufacturers' catalogs and printed installation instructions for instruments shall be furnished along with Working Drawings.
4. Within 48 hours of completion, furnish three copies of installation notes, initial readings and monitoring data taken immediately after installation. Forms to be used for recording, observation, monitoring and reporting of data shall be approved by the Engineer.

1.05 PROJECT CONDITIONS

- A. The Engineer will monitor the instruments per the frequency in Section 3.04.
- B. The Engineer shall be present to witness the drilling of the borehole and instrument installation for open standpipe piezometers and inclinometers. The boring shall be a standard penetration test (SPT) boring with sampling taken on 5-foot intervals to termination depth.
- C. In the event that anomalous condition (voids) are encountered during drilling or instrumentation installation, all work shall cease and remedial action will be taken to grout voids encountered before continuing installation.

1.06 STORAGE OF INSTRUMENTS

All instrumentation materials, after receipt at the site and prior to installation, shall be stored in an indoor, clean, dry and secure storage space. Instruments shall not be exposed to temperatures outside the manufacturer's stated working temperature range.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. General: All instrumentation materials, including readout units and other accessories, shall remain the property of the Owner following completion of the Contract.
- B. Inclinometers:
 1. Provide inclinometer casing, probe, cable, readout unit and accessories as manufactured by Slope Indicator Company or approved equal.
 2. Inclinometer casing shall be 2.75 inch outside diameter ABS or acceptable equivalent with broached internal keyways and twist tolerance better than 1-degree per 10 foot length. Couplings shall be of the non-telescoping type. Provide proper joint sealing associated with the selected type of casing such as solvent cement and tape or O-ring seals.
 3. Probe shall be a Slope Indicator Company Model 5032500 or approved equal. Probe shall be biaxial, consisting of two force balance accelerometers mounted at 90 degrees, with a 2-foot wheelbase. Probe shall be supplied in a carrying case.
 4. Cable shall be 100-feet long, sheathed with neoprene and have vulcanized rubber markers, and an internal wire rope core. Minimum cable outside diameter shall be 0.4 inch.

5. Readout unit shall be a Slope Indicator Company "Digitilt DataMate" or approved equal. The time interval between recordings 2-feet apart in the casing shall be such that the reading stabilizes to within plus or minus 1 unit of display within eight seconds. Readout unit shall include a battery charger.
6. Provide accessories. Consisting of end caps, tools and materials for attaching coupling and taking readings.
7. Provide inclinometer software such as Slope Indicator Company "DigiPro for Windows" or approved equal.
8. Factory calibrations of inclinometers shall include comprehensive calibrations of the force balance accelerometers before assemble in the probe. A final calibration shall include measurements made at 10 degree vertical intervals from minus 30 to plus 30 degrees with respect to vertical, and a comprehensive repeatability check over a smaller zone near vertical.
9. Grout shall consist of Type II Portland cement, bentonite and water. Special grout Type B shall include cement, bentonite and water and shall have approximately the same shear strength and compressibility as the surrounding ground. Grout shall be placed by tremie pipe method.
10. Surface protection shall have a diameter adequate to allow attachment of cable support assembly, or shall allow for an inclinometer casing extension while readings are being taken. The length of the inclinometer casing extension shall not vary by more than 0.05-inch from reading to reading. Provide cap end consisting of threaded pipe cap with hasp and padlock. Cap end shall be three (3) inches above the inclinometer casing.
11. Inclinometers shall be protected by standard monitoring well type protective flush cover with securing bolts. A concrete pad 18-inch square shall be poured around the protective cover. The well cover shall be of a size to adequately allow the placement of an inclinometer extension casing to permit readings without undue interference.

C. Open Standpipe Piezometers:

1. Provide threaded flush jointed Schedule 80 PVC pipe and suitable cap for open standpipe piezometer installation.
2. Tip shall consist of a 5-foot long No. 10 well screen section with sediment trap attached.
3. Sand backfill shall be placed around the piezometer to a level of 12-inches minimum above the top most well screen slot.
4. After placement of sand backfill, a 1-foot minimum bentonite seal consisting of bentonite pellets shall be placed. Add water as required to hydrate the bentonite pellets.
5. Fill remainder of borehole with a cement-bentonite grout and install flush mounted protective cover and 18-inch square concrete pad.

6. Piezometers to be extended shall have the old protective cover removed and disposed of. The PVC casing shall be extended to the new elevation flush below finished grade. The installation shall be protected by a flush mount protective cover as shown on the drawings.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Instrumentation shall be installed at the locations shown on the Drawings or as directed by the Engineer. Instruments shall be installed in accordance with the instrument installation schedule as required in Article 3.02 herein.
- B. Existing Conditions: Locate conduits and underground utilities in all areas where drilling from the ground surface will be required to install the instruments. Notification of utility companies shall be performed in accordance with the General Conditions of Contract. Locations of the instruments shall be modified, as approved by the Engineer, to avoid interference with the existing conduits and utilities. Repair damage to existing utilities resulting from instrument installations at no additional cost to the Owner.
- C. All instruments shall be clearly marked, labeled, and protected to avoid being covered, obstructed or otherwise damaged by construction operations or the general public. Both protective housing and box or vault covers shall be marked.
- D. Surveying: Immediately following installation, the location of the top of all instruments shall be surveyed to provide horizontal and vertical coordinates.

3.02 INSTALLATION SCHEDULE

Provide and install instruments at locations shown on the Drawings and as described below

Instrument	Quantity
Inclinometers	3
Standpipe Piezometers	4

3.03 BASELINE READINGS

- A. Baseline reading for inclinometers consists of two consistent sets of readings taken within 10 days of installation.
- B. Baseline reading for piezometers shall be taken within 5 days of installation.

3.04 MONITORING FREQUENCY

- A. For inclinometers monitor as follows:
 1. Monitor inclinometers weekly during re-filling of the reservoir and weekly for a period of 4 weeks after reservoir level reaches normal operating pool. Note day, time and reservoir level at date of each reading.

2. After initial readings are performed, readings shall be taken on a monthly basis for 6 months with the reservoir at normal operating pool.
 3. After the 6 month period all equipment and data files shall be submitted to the City for future readings and interpretation.
- B. For open standpipe piezometers monitor as follows:
1. Obtain baseline reading within 5 days of installation.
 2. Monitor piezometers on a weekly basis during refilling of reservoir. Note reservoir level at time of readings.
 3. After reservoir is filled to normal operating pool, monitor on a weekly basis until stabilized water levels are obtained.
 4. After stabilized water levels are attained, transfer all data files and equipment to City for future readings and interpretation.
- C. Monitoring frequencies may be modified by Engineer at any time, depending on location, construction progress, scheduling and efficiency of temporary Works, construction rates of movement, and other factors affecting of earth or structures that are subject to monitoring.
- D. Monitoring frequency does not indicate monitoring required for Contractor's control or safety of construction. Perform monitoring necessary for safety and performance of construction operations.

3.05 REVIEW AND ALERT LEVELS

- A. Response levels for instruments are shown on the Drawings. Immediately inform the City when the review and alert levels are reached.
- B. If Review Level is reached.
1. Contractor to meet with Engineer to discuss response action(s), and develop a Review-Level Response Plan of Action.
 2. Implement reviewed and accepted Review-Level Plan of Action.
- C. If Alert Level is reached:
1. Work may be stopped by Engineer.
 2. Meet with Engineer to discuss response action(s) and develop an Alert-Level Response Plan of Action
 3. Install and monitor additional instruments as directed by the Engineer.
 4. Implement reviewed and accepted Alert-Level Response Plan of Action.

- D. Alert Levels are not to be exceeded. Activities may be suspended in affected area with exception of those actions necessary to avoid exceeding Alert Level or to make the Work and affected properties safe and secure.
- E. No response levels are specified for instruments other than those in Article A, above. For other instruments not specified in Article A, above, the Engineer can order the Contractor to take actions as defined under the Review and Alert Levels when the Engineer deems necessary based on the monitoring data.

3.06 REPORTING FREQUENCY AND FORMAT

- A. Engineer to submit three (3) copies of the instrument monitoring data, on forms provided by the Engineer within 24 hours after the observation has been made.
 - 1. A copy of the plot of measured value versus time, which shall include a time history of reservoir filling activity likely to influence such readings.
 - 2. Make instrument readings available to the Engineer within one hour of monitoring.
 - 3. A daily log of major construction events, survey data and observations on forms provided by the Engineer.
- B. Submit reduced data and updated data plots of changes in ground movements within 2 working days after observations have been made.
- C. Inform City immediately when Review Level or Alert Level is reached for any instrument.

3.07 INSTRUMENT PROTECTION, MAINTENANCE, AND REPAIR

- A. The Contractor shall protect all instruments and appurtenant fixtures, leads, connections, and other components of instrumentation systems from damage due to construction operations, weather, traffic, and vandalism. Provide substantial protective barriers around instruments in construction areas.
- B. Maintain the instruments by draining water and flushing debris from under protective covers and keeping covers locked and sealed at all times. Protect and maintain instruments. Keep protective covers secured.
- C. If an instrument is damaged or inoperative, including an existing instrument installed by others, the Contractor's instrumentation personnel shall repair or replace the damaged or inoperative instrument within 72 hours at no additional cost to the Owner. The Contractor shall notify the Engineer at least 24 hours prior to repairing or replacing a damaged or inoperative instrument. The Engineer will be the sole judge of whether repair or replacement is required. The Engineer may impose a work stoppage in the vicinity of the damaged or inoperative instrument until it is again operational, at no additional cost to the Owner.

3.08 DISCLOSURE OF DATA

The Contractor shall not disclose any instrumentation data to third parties and shall not publish data without prior approval and written consent of the Owner.

3.09 DISPOSITION OF INSTRUMENTS

A. Standpipe piezometers:

1. All instruments on public property shall remain in place at the completion of the Contract.
2. All noted standpipe piezometers shall remain and be protected for long term monitoring use..

B. Inclinometers:

All inclinometers shall remain and be protected for long term monitoring use.

3.10 ABANDONMENT OF PIEZOMETERS

- A. Existing piezometers to be abandoned shall be cutoff a minimum of 1 foot below ground surface. Any protective casing or well cover/concrete pad shall be demolished and removed from the site.
- B. Open standpipes shall be filled by tremie method with a lean cement grout to the ground surface. Refill as necessary to completely fill pipe.
- C. After cement gout hardens, place compacted fill around abandoned installation to fill surface voids prior to placing new fill.

+++ END OF SECTION 02460 +++

Attachment No. 7

Section 02575, Removing and Replacing
Pavement

**SECTION 02575
REMOVING AND REPLACING PAVEMENT**

PART 1 – GENERAL

1.01 SCOPE

- A. The work to be performed under this Section shall consist of providing all labor, equipment and materials to remove and replace existing pavement, sidewalks, steps, patios, curbs, and gutters in paved areas where such have been removed for construction of utilities and appurtenances.
- B. Existing pavement, sidewalks, curbs, and gutters shall be replaced to meet the current City of Atlanta standards, or as indicated on the drawings or directed by the Engineer.

1.02 SUBMITTALS

- A. If required by the City or Engineer, provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the materials supplier/producer and the Contractor.
- B. All submittals shall be in accordance with the requirement of the General Conditions.

PART 2 – PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

- A. Graded Aggregate Base: The sub-base shall be a minimum of 6-inches thick and a width equal to the width of the finished paving. Aggregate base shall be Class A, meeting the requirements of the Georgia Department of Transportation Specification Section 815.01.
- B. Base: The base for all paved roadways shall conform to the requirements of the Georgia Department of Transportation Specifications for the Hot Mix asphalt Section 828 Type "B".
- C. Tack Coat: Tack coat shall conform to Section 413 of the Georgia Department of Transportation Standard Specifications.
- D. Binder Course: The binder course of all paved roadways shall conform to the requirements of Section 400, Type "B" of the Georgia Department of Transportation Standard Specifications.
- E. Surface Course: The surface course for all pavement, including prime or tack coat when required by the Engineer, shall conform to the requirements of Section 400, Type "E" of the Georgia Department of Transportation Standard Specifications
- F. Concrete: Provide concrete and reinforcing for concrete pavement or base courses in accordance with the requirements of the Georgia Department of Transportation Standard Specifications, Section 430. Concrete shall be minimum 3,000 psi compressive strength or as otherwise shown on the Drawings.
- G. Special Surfaces: Where pavement, sidewalks, steps, patios, curbs, or gutters are disturbed or damaged which are constructed of specialty type surfaces, e.g., brick or stone, these surfaces shall be restored utilizing similar, if not original, materials to match the existing. Special surfaces shall be

removed and replaced to the limits to which they were disturbed or as indicated on the drawings or as directed by the Engineer.

2.02 TYPES OF PAVEMENTS

- A. General: All existing pavement removed, destroyed or damaged by construction shall be replaced with the same type and thickness of pavement as which existed prior to construction, unless otherwise directed by the Engineer/Owner. Materials, equipment and construction methods used for paving work shall conform to the Georgia Department of Transportation standard specifications applicable to the particular type specified or indicated on the drawings for replacement, repair, or new pavements.
- B. Aggregate Base: Aggregate base shall be supplied and constructed in accordance with the requirements of Section 310 of the Georgia Department of Transportation Standard Specifications. The maximum thickness to be laid in a single course shall be 6-inches compacted. If the design thickness of the base is more than 6-inches, it shall be constructed in two or more courses of approximate equal thickness. After the material placed has been shaped to line, grade, and cross-section, it shall be rolled until the course has been uniformly compacted to at least 100 percent of the maximum dry density when Group 2 aggregate is used, or to at least 98 percent of maximum dry density when Group 1 aggregate is used.
- C. Concrete Pavement: Concrete pavement or base courses shall be replaced with concrete. The surface finish of the replaced concrete pavement shall conform to that of the existing pavement. The surface of the replaced concrete base course shall be left rough. The slab depth shall be equivalent to the existing concrete pavement or base course, but in no case less than 6-inches thick. Transverse and longitudinal joints removed from concrete pavement shall be replaced at the same locations and to the same types and dimensions as those removed. Concrete pavements or concrete base courses shall be reinforced as indicated on the drawings.
- D. Asphaltic Concrete pavement: Asphaltic concrete pavement construction shall conform to Georgia Department of Transportation Standard Specifications, Section 400. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared; surface is intact, firm, properly cured, dry; and the tack coat has been applied. Apply and compact the base in maximum layer thickness by asphalt spreader equipment of design and operation approved by the Engineer/Owner. After compaction, the black base shall be smooth and true to established profiles and sections. Apply and compact the surface course in a manner approved by the Engineer/Owner. Immediately correct any high, low, or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.
- E. Surface Treatment Pavement: Bituminous penetration surface treatment pavement shall be replaced with a minimum thickness of 1-inch conforming to Section 424, Georgia Department of Transportation Standard Specifications.
- F. Gravel Surfaces: Existing gravel road, drive, and parking area replacement shall meet the requirements of graded aggregate base course in accordance with B above. This surfacing may be authorized by the Engineer/Owner as a temporary surface for paved streets until replacement of permanent pavement is authorized.
- G. Temporary Measures: During the period between pavement removal and complete replacement of permanent pavement, maintain highways, streets, and roadways by the use of steel traffic plates anchored to prevent movement. The backfill above the pipe shall be compacted, as specified in

Section 02200/02225 of these Specifications, up to the existing pavement surface to provide support for the steel traffic plates. All pavements shall be replaced within seven calendar days of their removal unless otherwise specified or approved by the Engineer.

PART 3 – EXECUTION

3.01 LOCATIONS FOR PAVEMENT REPLACEMENT

A. Pavement Replacement:

1. All utility trenches for roadway crossings
2. All utility trench longitudinal installations
3. All locations where pavement must be removed or is damaged in the execution of the Work

B. "Graded Aggregate" pavement repair shall be used only where approved by the Engineer/Owner. Compact to at least 95% Standard Proctor Density. (ASTM D-698)

3.02 REMOVING PAVEMENT

- A. General: Remove existing pavement as necessary for installing the pipeline and appurtenances. Existing pavement and sub-base shall be removed for trench construction and pipe installation. Existing pavement on either side of the trench construction area shall be completely milled from edge of pavement to edge of pavement in order to replace pavement from edge of pavement to edge of pavement for all disturbed paved areas where specified or indicated on the drawings.
- B. Remove and replace pavement and base to outer edge of existing pavement if existing pavement width is 24-inches or less from side of trench to outer edge of pavement.
- C. Marking: Before removing any pavement, mark the pavement neatly paralleling pipelines and existing street alignment. Space the marks the width of the trench.
- D. Saw Cutting: Under no circumstances shall the Contractor be allowed to remove concrete or asphalt pavement without prior saw cutting. Asphalt pavement shall be saw cut along the marks using suitable equipment to the maximum permissible ditch width. The saw cutting shall be deep enough to produce an even, straight cut through the entire depth of pavement to the subgrade.
- E. Breaking: Break asphalt pavement along the marks using pavement shearing equipment, jack hammers or other suitable tools. Break concrete pavement along the marks by scoring with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.
- F. Machine Pulling: Do not pull pavement with machines until the pavement is completely broken and separated from pavement to remain.
- G. Damage to Adjacent Pavement: Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement by the same means as specified under C above..
- H. Sidewalks and Patios: Remove and replace any sidewalks or patios disturbed by construction for their full width and to the nearest undisturbed joint.

- I. Curbs and Gutters: Tunnel under or remove and replace any curb and/or gutter, which is disturbed by construction to the nearest undisturbed joint.
- J. Steps: Completely remove and replace any steps, constructed of concrete or special surfaces, which are disturbed by construction.

3.03 REPLACING PAVEMENT

A. Weather Limitations:

1. Apply bituminous tack coat only when the ambient temperature in the shade has been at least 50 degrees F for 12 hours immediately prior to application.
2. Do not conduct paving operations when surface is wet or contains excess of moisture that would prevent uniform distribution and required penetration.
3. Construct asphaltic courses only when atmospheric temperature in the shade is above 40 degrees F, when the underlying base is dry and when weather is not rainy.
4. Place base course when air temperature is above 35 degrees F and rising.

B. Grade Control: Establish and maintain the required lines and grades for each course during construction operations.

C. Preparation of Subgrade: Upon completion of placement and compaction of the backfill, the Contractor shall arrange to have the compaction tested by an independent testing laboratory approved by the City. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks, and curbs and/or gutters removed.

1. The existing street pavement or surface shall be removed or milled along the lines of the work from edge of pavement to edge of pavement. Pavement shall be replaced from edge of existing pavement to edge of existing pavement.
2. Trench backfill shall be compacted for the full depth of the trench as specified in Section 02200/02225 of these Specifications.
3. Temporary trench backfill along streets and driveways shall include 6-inches of crushed stone as a temporary surfacing of the trenches. This temporary surface shall be maintained carefully at grade, dust-free, by the Contractor until the backfill of the trench has thoroughly compacted in the opinion of the Engineer/Owner, and permission is granted to replace the street pavement.
4. When temporary crushed stone is approved by the Engineer to be sufficient surface for gravel pavement, the surface shall be graded smooth and to an elevation that will make the final permanent surfacing level with the existing surface that was undisturbed.

D. Pavement Replacement:

1. Prior to replacing pavement, make a final cut in concrete pavement 12-inches back from the edge of the damaged pavement with a concrete saw. Remove asphalt pavement 12-inches back from

the edge of the damaged pavement using pavement shearing equipment, jackhammers or other suitable tools.

2. Replace and repave all street and roadway pavement from edge of pavement to edge of pavement as specified or indicated on the Drawings. Replace driveways, sidewalks, and curbs with the same material as existing, to nearest existing undisturbed construction joint and to the same dimensions and grades prior to the work being performed.
3. If the temporary crushed stone or chert surface is to be replaced, the top 6-inches shall be removed and the crushed stone surfacing for unpaved streets or the base for the bituminous surface shall be placed.
4. Following this preparation, the crushed stone base shall be primed with an approved bituminous material and surfaced with the specified type of bituminous surface treatment.
5. Where the paved surface is to be replaced with asphaltic concrete pavement, concrete pavement or with a concrete base and a surface course, the temporary chert or crushed stone surface and any necessary backfill material, additional existing paving and new excavation shall be removed to the depth and width specified or indicated on the Drawings/details. All edges of the existing pavement shall be cut to a straight, vertical edge. Care shall be used to get a smooth joint between the old and new pavement and to produce an even surface on the completed street. Concrete base slabs and crushed stone bases, if required, shall be placed and allowed to cure for three days before bituminous concrete surface courses are applied. Expansion joints, where applicable, shall be replaced in a manner equal to the original joint.

E. Pavement Resurfacing:

1. After all pipe line installations are complete and existing pavement has been removed or milled from edge of pavement to edge of pavement, apply tack coat and surface course as specified under paragraph B above.
2. Resurfacing limits shall be perpendicular to the road centerline. The limits of resurfacing shall be 10 feet beyond the edge of the pavement replacement on the main road being resurfaced.
3. Where pavement damaged with potholes, the Contractor shall remove all existing loose pavement material and fill the hole with black base, as specified, to the level of the existing pavement.

F. Pavement Striping: Pavement striping removed or paved over shall be replaced with the same type, dimension, and material as original unless directed otherwise by the Engineer.

G. Installation of Traffic Plates: Following completion of utility installation including backfilling and compaction but prior to replacement of pavement, steel plates shall be used to temporarily carry vehicular traffic as follows:

1. All Steel plates shall meet ASTM structural specifications having "A36" designation with minimum yield stress of 36 ksi (ksi = kilopounds per square inch).
2. Asphaltic patching material (cold mix) shall be used to secure the steel plate around its edges. Alternatively, all sides of the plate or plates must be secured to the ground surface with A.R.E.A. standard railroad spikes. No spikes shall be left lying on the roadway.

3. Trench must be backfilled to within eight (8) inches from top of existing pavement prior to placing the steel plate.
4. No plate is allowed over a trench having a width greater than 48 inches when adequate soil conditions are present. When the trench is greater than 48 inches, the entire lane containing the trench shall be closed. Before closing a lane, a "Lane Closure Permit" must be obtained from the City of Atlanta, Department of Public Works, Bureau of Traffic and Transportation. At least 24 hours prior notification is required for the "Lane Closure Permit".
5. All necessary warning signs, barricades, and lights shall be adequately provided and placed for the safety of the public and in full conformity with the MUTCD at no additional cost to the City.
6. The width of a trench is measured normal to the length of the trench. The largest reading of the measurements is the determining factor for width. For a series of steel plates on any continuous trench, all plates must have the same thickness.
7. Trench must be fully covered by the steel plate with a minimum of twelve (12) inches of asphalt taper on all sides of the plate.
8. Upon the completion of the work, the existing surface shall be cleaned and pavement restored as specified or indicated on the drawings to the City of Atlanta standards.

3.04 SIDEWALK, CURB, AND GUTTER REPLACEMENT

A. Construction:

1. All concrete sidewalks, curbs, and gutters shall be replaced with concrete.
2. Preformed joints shall be 1/2-inch thick, conforming to the latest edition of AASHTO M59 for sidewalks and AASHTO M 123 for curbs.
3. Forms for sidewalks shall be of wood or metal, shall be straight and free from warp, and shall be of sufficient strength, when in place, to hold the concrete true to line and grade without springing or distorting.
4. Forms for curbs shall be metal and of an approved section. They shall be straight and free from distortions, showing no vertical variation greater than 1/8-inch in 10 feet and no lateral variation greater than 1/4-inch in 10 feet from the true plain surface on the vertical face of the form. Forms shall be of the full depth of the structure and constructed such to permit the inside forms to be securely fastened to the outside forms.
5. Securely hold forms in place true to the existing lines and grades.
6. Wood forms may be used on radii and for special sections, as approved by the Engineer. Where wooden forms are used, they shall be free from warp and shall be the nominal depth of the structure.
7. All mortar and dirt shall be removed from forms and all forms shall be thoroughly oiled or wetted before any concrete is deposited.

- B. When a section is removed, the existing sidewalk, curb, or gutter shall be cut to a neat line, perpendicular to both the centerline and the surface of the concrete slab. Existing concrete shall be cut along the nearest existing construction joints; if such joints do not exist, the cut shall be made at minimum distances shown on the Drawings.
- C. Existing concrete sidewalks, curbs, and gutters that have been cut and removed for construction purposes shall be replaced with the same width and surface as the portion removed to match the existing. Sidewalks shall have a minimum uniform thickness of 4-inches. The new work shall be neatly jointed to the existing concrete so that the surface of the new work shall form an even, unbroken plane with the existing surfaces.
- D. The subgrade shall be formed by excavating to a depth equal to the thickness of the concrete, plus 2-inches. Subgrade shall be of such width as to permit the proper installation and bracing of the forms. Subgrades shall be compacted to 95% std. proctor by hand tamping or rolling. Soft, yielding or unstable material shall be removed and backfilled with satisfactory material. Place 2-inches of crushed stone under all sidewalks, curbs, and gutters and compact thoroughly, then finish to a smooth, unyielding surface at proper line, grade, and cross-section.
- E. Joint for Curbs and Gutters:
 - 1. Construct joints true to line with their faces perpendicular to the surface of the structure and within 1/4-inch of their designated position.
 - 2. Thoroughly spade and compact the concrete at the faces of all joints filling all voids.
 - 3. Install expansion joint materials at the point of curve at all street returns. Install expansion joint material behind the curb at abutment to sidewalks and adjacent structures.
 - 4. Place contraction joints every 10 feet along the length of the curbs and gutters. Form contraction joints using steel templates or division plates which conform to the cross section of the structure. Leave the templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Contraction joint templates or plates shall not extend below the top of the steel reinforcement or they shall be notched to permit the reinforcement to be continuous through the joint. Contraction joints shall be a minimum of 1-1/2-inches deep.
- F. Expansion joints shall be required to replace any removed expansion joints or in new construction. Expansion joints shall be true and even, shall present a satisfactory appearance, and shall extend to within 1/2-inch of the top of finished concrete surface.
- G. Finishing:
 - 1. Strike off the surface with a template and finish the surface with a wood float using heavy pressure, after which, contraction joints shall be made and the surface finished with a wood float or steel trowel.
 - 2. Finish the face of the curbs at the top and bottom with an approved finishing tool of the radius indicated on the Drawings.
 - 3. Finish edges with an approved finishing tool having a 1/4-inch radius.
 - 4. Provide a final broom finish by lightly combing with a stiff broom after troweling is complete.

5. The finished surface shall not vary more than 1/8-inch in 10 feet from the established grade.

H. Driveway and Sidewalk Ramp Openings:

1. Provide driveway openings of the widths and at the locations directed by the Engineer as indicated on the drawings or to match the existing.
 2. Provide sidewalk ramp openings in conformance with the applicable regulations and as directed by the Engineer/Owner.
- I. Concrete shall be suitably protected from freezing and excessive heat. It shall be kept covered with burlap or other suitable material and kept wet until cured. Provide necessary barricades to protect the work. All damage caused by people, vehicles, animals, rain, the Contractor's operations and the like shall be repaired by the Contractor, at no additional expense to the City.

3.05 MAINTENANCE

The Contractor shall maintain the surfaces of roadways built and pavements replaced until the acceptance of the Project. Maintenance shall include replacement, grading, reshaping, wetting, and compacting as necessary to prevent raveling of the road material, the preservation of reasonably smooth surfaces and the repair of damaged or unsatisfactory surfaces, to the satisfaction of the Engineer. Maintenance shall include sprinkling as may be necessary to abate dust from the gravel surfaces.

3.06 SUPERVISION AND APPROVAL

- A. Pavement restoration shall be in accordance with the requirements of the applicable jurisdiction responsible for the pavement. Obtain agency approval of pavement restorations before requesting final payment.
- B. Obtain the Engineer's approval of restoration of pavement, such as private roads and drives that are not the responsibility of any jurisdiction.
- C. Complete pavement restoration as soon as possible after backfilling.
- D. Failure of Pavement: Should any pavement restoration or repairs fail or settle during the term of the contract or warranty period, promptly restore or repair defects.
- E. Prior to acceptance and approval of any asphaltic concrete binder and/or topping which is installed for the purpose of City maintenance, a representative of the City of Atlanta's Department of Public Works, Bureau of Traffic and Transportation may require one or all of the following tests: 1) coring, 2) extraction, 3) compaction, 4) density. The frequency and location of these tests will be left up to the discretion of the /Engineer.

3.07 CLEANING

The Contractor shall remove all surplus excavated materials and debris from the site of the work and dispose of and shall restore street, roadway, or sidewalk surfacing to its original grade or that as

indicated on the drawings and as good or better condition that existed prior to the work being performed..

3.08 TRAFFIC CONTROL

Traffic control shall be in accordance with applicable permits and paragraph 3.03 G of this section of the specifications and any requirements of the General or Special Conditions.

+++ END OF SECTION 02575 +++

Attachment No. 8

Section 03300, Cast-in-Place Concrete

**SECTION 03300
CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL

1.01 SCOPE

A. General

1. Contractor shall furnish all labor, materials, equipment and incidentals needed to provide form work, reinforcement, concrete including all concrete joints, grout and incidentals required to complete the Work as shown and specified.
2. The Work includes providing concrete consisting of Portland cement, fine and coarse aggregate, water, and approved admixtures combined, mixed, transported, placed, finished and cured. The Work also includes:
 - a. Providing openings in concrete to accommodate the Work under this and other Sections and building into the concrete all items such as sleeves, frames, anchor bolts, inserts and all other items to be embedded.
 - b. Providing openings in concrete to accommodate the work under other contracts and building into the concrete all items such as sleeves, frames, anchor bolts, inserts and all other items required to be embedded under other contracts.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the installation of items that must be installed in the concrete as a prime responsibility of the Contractor.
2. Notify other contractors in advance of the placing of concrete to provide the other contractors with sufficient time for furnishing of items included in their contracts that must be installed in the concrete.
3. Required City formal pour card with all required signatures.

C. Classes of Concrete:

1. Class "A" concrete 4,000 psi compressive strength at 28 days shall be steel reinforced and includes the following:
 - a. Foundations.
 - b. Walls.
 - c. Slab on grade.
 - d. Beams.
 - e. Elevated concrete floors.
 - f. Columns.
2. Class "B" concrete 3,000 psi compressive strength at 28 days shall be placed without forms or with simple forms, with little or no reinforcing, and includes the following:

- a. Sidewalks.
- b. Curbs.
- c. Pavement patch.
- d. Thrust blocking.
- e. Fence Post footing.
- f. Mud Slabs.
- g. Fill concrete.

D. Related Work specified elsewhere:

- 1. Section 02200 - Earthwork
- 2. Section 02575 - Removing and Replacing Pavement

1.02 SUBMITTALS

- A. Samples: Submit samples of materials as specified and as otherwise may be requested by the Engineer, including names, sources and descriptions.
- B. Shop Drawings: Submit for approval the following:
 - 1. List of concrete materials and concrete mix designs proposed for use. Include the results of all tests performed to qualify the materials and to establish the mix designs.
 - 2. Copies of manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures and bonding agents.
- C. Laboratory Test Reports: Submit copies of laboratory test reports for concrete cylinders, materials and mix design tests. ENGINEER'S review will be for general information only. Production of concrete to comply with specified requirements is the responsibility of the Contractor. Submit the testing lab's average strength curve from the design mix proportions of the approved materials.
- D. Submit notarized certification of conformance to referenced standards to the Engineer and a copy of the batch plant's most recent scale calibration.
- E. Delivery Tickets: Furnish to Engineer copies of all delivery tickets for each load of concrete delivered to the site. Provide items of information as specified in ASTM C 94, Section 14.

1.03 QUALITY ASSURANCE

- A. Reference Standards: Comply with the applicable provisions and recommendations of the latest edition following, except as otherwise shown or specified.
 - 1. ACI 301-81, Specification for Structural Concrete for Buildings, (includes ASTM Standards referred to herein).
 - 2. ACI 304-83, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
 - 3. ACI 305-82, Recommended Practice for Hot Weather Concreting.
 - 4. ACI 306-78, Recommended Practice for Cold Weather Concreting.
 - 5. ACI 308-81, Standard Practice for Curing Concrete.

6. ACI 309-82, Recommended Practice for Consolidation of Concrete.
7. ACI 318-89, Building Code Requirements for Reinforced Concrete.
8. ACI 350-88.
9. ACI 347-78, Recommended Practice for Concrete Formwork.
10. ASTM C31-85, Standard Method of Making and Curing Concrete Test Specimens in the Field.
11. ASTM C33-86, Standard Specification for Concrete Aggregates.
12. ASTM C39-86, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
13. ASTM C40-86, Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
14. ASTM C42-84a, Standard Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
15. ASTM C94-86a, Standard Specification for Ready-Mixed Concrete.
16. ASTM C138-81, Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete.
17. ASTM C143-78, Standard Test Method for Slump of Portland Cement Concrete.
18. ASTM C150-85a, Standard for Portland Cement.
19. ASTM C157-86, Standard Test Method for Length Change of Hardened Cement Mortar and Concrete.
20. ASTM C171-69, (1986) Standard Specification for Sheet Materials for Curing Compounds.
21. ASTM C172-82, Standard Method of Sampling Freshly Mixed Concrete.
22. ASTM C173-78, Standard Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
23. ASTM C192-81, Standard Method of Making and Curing Concrete Test Specimens in the Laboratory.
24. ASTM C231-82, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
25. ASTM C260-86, Standard Specification for Air-Entraining Admixtures for Concrete.
26. ASTM C494-86, Standard Specification for Chemical Admixtures for Concrete.
27. ASTM C827-82, Standard Test Method for Early Volume Change of Cementitious Mixtures.
28. Federal Specification CCC-C-467C: Cloth, Burlap Jute or Kenaf.

B. Concrete Testing Service:

Testing Laboratory:

- a. The concrete testing will be performed by an independent testing laboratory selected by the Contractor. Payment for concrete testing shall be included in the Lump Sum Price.
- b. Materials and installed Work may require testing and retesting, as directed by the Engineer, at any time during the progress of the Work. Allow free access to material stockpiles and facilities at all times and assist the testing laboratory in collection of samples as requested. The costs of retests made necessary by the failure of materials supplied by the Contractor, his agents or subcontractors, to conform to the requirements of these Contract Documents shall be paid by the Contractor. Contractor shall provided at least 24 hours advance notice of concrete placement operations to the Testing Laboratory.

C. Qualifications of Water-Reducing Admixture Manufacturer:

1. Water-reducing admixtures shall be manufactured under strict quality control in facilities operated under a quality assurance program. Contractor shall furnish copy of manufacturer's quality assurance handbook to document the existence of the program. Manufacturer shall maintain a concrete testing laboratory which has been approved by the Cement and Concrete Reference Laboratory at the Bureau of Standards, Washington, D.C.
2. Provide a qualified concrete technician employed by the admixture manufacturer to assist in proportioning the concrete for optimum use of the admixture. The concrete technician, when requested, shall advise on proper addition of the admixture to the concrete and on adjustment of the concrete mix proportions to meet changing job site conditions.

D. Test for Concrete Materials:

1. Submit written reports to the Engineer, for each material selected and tested, prior to the start of Work. Provide the Project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each materials, and test results. Indicate acceptability of materials for intended use.
2. Have the approved testing lab run a sample load of the design mix and make a minimum of 12 test cylinders. Then have lab do cylinder breaks at 3, 7, 21 and 28 days and plot an average strength curve for the mix design. Submit it to Engineer prior to any concrete pour.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

All materials used for concrete must be kept clean and free from all foreign matter during transportation and handling and kept separate until measured and placed in the mixer. Bins or platforms having hard clean surfaces shall be provided for storage. Suitable means shall be taken during hauling, piling and handling to insure that segregation of the coarse and fine aggregate particles does not occur and the grading is not affected.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement:

1. Portland cement, ASTM C 150, Type II.
2. Use portland cement made by a qualified, acceptable manufacturer and produced by not more than one plant.
3. Do not use cement which has deteriorated because of improper storage or handling.
4. Type I cement NOT PERMITTED.

B. Aggregates: ASTM C 33 and as herein specified.

1. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces. Slag materials are not allowed.
2. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances. Dune sand, bank run sand and manufactured sand are not acceptable.
3. Coarse Aggregate: Clean granitic, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Coarse Aggregate Size: Size to be ASTM C 33, Nos. 57 or 67, except that No. 467 may be used for footings, foundation mats and walls 16 inches or greater in thickness.
- C. Water: Clean, free from injurious amounts of oils, acids, alkalis, organic materials or other substances that may be deleterious to concrete or steel.

2.02 CONCRETE ADMIXTURES

- A. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instruction. Do not use admixtures, which have not been incorporated and tested in the accepted mixes, unless otherwise authorized in writing by the Engineer.
- B. Air-Entraining Admixtures: ASTM C 260.
 1. Product and Manufacturer: Provide one of the following:
 - a. Daravair as manufactured by Grace Construction Products.
 - b. MB-VR as manufactured by Master Builders Company.
 - c. Sika AER as manufactured by Sika Chemical corporation.
 - d. Air Entraining Agent as manufactured by W. R. Meadows.
 - e. Or equal.
 2. Air entrainment required for all concrete used on this project.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
 1. Proportion all concrete with non-air entraining, normal setting, water-reducing, aqueous solution of a modification of the salt of polyhydroxylated organic acids. The admixture shall not contain more chloride ions than are contained in municipal drinking water. Provide one of the following:
 - a. WRDA-86 as manufactured by Grace Construction Products.
 - b. Pozzoloth by Master Builders Company.
 - c. Plastocrete 161 as manufactured by Sika Chemical corporation
 - d. Approved Equal.
 2. Water-reducing admixture required for all type A and B concrete unless directed otherwise by the Engineer.
- D. Calcium Chloride: Do not use calcium chloride in concrete.

- E. Do not use a retarder in the concrete, unless written permission is given by Engineer.

2.03 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes of concrete. Use the same design mix for both classes of concrete. Mixes subject to the following limitations:

1. Specified 28-day Compressive Strength:
 - a. Class A - 4,000 psi.
 - b. Class B - 3,000 psi.
2. Maximum Water-Cement Ratio by Weight: .45.

Coarse Aggregate Number	Minimum Cement Content, lb/yd ³	Percent Air Content
57,67	564	6 ± 1%
467	517	5 1/2 ± 1%

- B. Use an independent testing facility approved by the Engineer for preparing and reporting proposed mix designs.

1. The testing facility shall not be the same as used for field quality control testing.
2. Calibration charts on the lab equipment must be submitted.

- C. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on the Project for concrete required. Comply with ACI 211.1 and report to the Engineer the following data:

1. Complete identification of aggregate source of supply.
2. Tests of aggregates for compliance with specified requirements.
3. Scale weight of each aggregate.
4. Absorbed water in each aggregate.
5. Brand, type and composition of cement.
6. Brand, type and amount of each admixture.
7. Amounts of water used in trial mixes.
8. Proportions of each material per cubic yard.

9. Gross weight and yield per cubic yard of trial mixtures.
 10. Measured slump.
 11. Measured air content.
 12. Compressive strength developed at 3, 7, 21 and 28 days, from not less than 3 test cylinders cast for each 7-day and 28-day test, and for each design mix.
- D. Submit written reports to the Engineer of proposed mix of concrete at least 15 days prior to start of Work. Do not begin concrete production until mixes have been approved by the Engineer.
 - E. Laboratory Trial Batches: When laboratory trial batches are used to select concrete proportions, prepare test specimens and conduct strength test as specified in ACI 301, Chapter 3 - Proportioning, Method 1. 4,000 psi concrete mixes need not be designed for greater than 4,600 psi regardless of the production facilities standard deviation.
 - F. Field Experience Method: When field experience methods are used to select concrete proportions, establish proportions as specified in ACI 301, Chapter 3, Method 2.
 - G. Water-Cement Ratio Methods: If suitable data from field experience or laboratory trial batches cannot be obtained, concrete proportions may be established as specified in ACI 301, Chapter 3, Method 3.
 - H. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to the City and as accepted by Engineer. Laboratory test data for revised mix designs and strength results must be submitted to the Engineer for acceptance before using the revised mixes.
 - I. Admixtures:
 1. Use air-entraining and water reducer admixtures in all concrete. Add air-entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content within the prescribed limits.
 2. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.
 - J. Slump Limits: Proportion and design mixes to result in concrete slump at the point of placement as follows:
 1. For footings and substructure walls, not less than 1 inch and not more than 3 inches.
 2. For slabs on grade, elevated concrete floor, beams, walls and columns, not less than 1 inch and not more than 4 inches.

2.04 CHEMICAL HARDENER

Unless otherwise specified, all interior concrete floors shall be treated with a liquid hardener composed of magnesium and zinc fluorosilicates combined with an anionic surfactant for improved wetting penetration. Liquid hardener shall be colorless, nontoxic, nonflammable, and compatible with and providing good adhesion for subsequent toppings and/or coatings. Liquid hardener shall be suitable for use on new or old concrete floors and shall comply with Corps of Engineer Specification 204.

2.05 EPOXY FLOOR SEALER

Epoxy floor sealer shall be two-component, 100 percent solids, epoxy coating that provides a smooth, tough, flexible, wear abrasion, and chemical resistant surface. Sealer shall be U.S.D.A. approved for use in food processing plants. Epoxy floor sealer shall be applied on the operating floor, screening areas (except where concrete coatings are specified), storage area, truck entrance, MCC room and mechanical room. Unless otherwise specified, sealer shall be colored gray.

2.06 CONCRETE COATINGS

Provide concrete coating TNEMEC Series 61, TNEMEC Liner or equal.

2.07 EPOXY BONDING AGENT

Provide an epoxy-resin bonding agent as specified in Section 03250 of the Specifications, everywhere new concrete is poured against old or when the new concrete has been left 30 days or more without the following new pour place against it.

2.08 CONCRETE CURING MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 10 ounces per square yard and complying with AASHTO M 182, Class 3.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171:

1. Waterproof paper.
2. 4 mil polyethylene.

C. Curing and Sealing Compound: ASTM C-309:

Product and Manufacturer: Provide one of the following:

- a. Res-X curing compound as manufactured by the Burke Company.
- b. Masterkure as manufactured by Master Builders Company.
- c. Concrete Curing Compounds as manufactured by W. R. Meadows, Inc.
- d. Or equal.

PART 3 - EXECUTION

3.01 CONCRETE MIXING

A. General:

1. Concrete may be produced at batch plants or it may be produced by the ready-mixed process. Batch plants shall comply with the recommendations of ACI 304, and shall have sufficient capacity to produce concrete of the qualities specified, in quantities required to meet the construction schedule. All plant facilities are subject to testing laboratory inspection and acceptance of the Engineer.
2. Mixing:
 - a. Mix concrete with an approved rotating type batch machine, except where hand mixing of very small quantities may be permitted.
 - b. Remove hardened accumulations of cement and concrete frequently from drum and blades to assure acceptable mixing action.
 - c. Replace mixer blades when they have lost 10 percent of their original height.
 - d. Use quantities such that a whole number of bags of cement is required, unless otherwise permitted.
- B. Ready-Mix Concrete: Comply with the requirements of ASTM C 94, and as herein specified. Proposed changes in mixing procedures, other than herein specified, must be accepted by the Engineer before implementation.
 1. Plant equipment and facilities: Conform to National Ready Mix Concrete Association "Plant and Delivery Equipment Specification".
 2. Mix concrete in revolving type truck mixers which are in good condition and which produce thoroughly mixed concrete of the specified consistency and strength.
 3. Do not exceed the proper capacity of the mixer.
 4. Mix concrete for a minimum of two minutes after arrival at the job site, or as recommended by the mixer manufacturer.
 5. Do not allow the drum to sit while in transit.
 6. Mix at proper speed until concrete is discharged.
 7. Maintain adequate facilities at the job site for continuous delivery of concrete at the required rates.
 8. Provide access to the mixing plant for the Engineer at all times.
- C. Maintain equipment in proper operating condition, with drums cleaned before charging each batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing, or holding dry-mixed materials too long in the mixer before the addition of water and admixtures.

3.02 TRANSPORTING CONCRETE

- A. Transport and place concrete not more than 60 minutes after water has been added to the dry ingredients.
- B. Take care to avoid spilling and separation of the mixture during transportation.

- C. Do not place concrete in which the ingredients have been separated.
- D. Do not retemper partially set concrete, and do not add any water at the jobsite.
- E. Use suitable and approved equipment for transporting concrete from mixer to forms.

3.03 CONCRETE PLACEMENT

- A. General: Place concrete continuously so that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. Where new concrete is placed next to existing, or a section cannot be placed continuously, provide construction joints as specified in Section 03250 of these Specifications. Apply approved epoxy bonding agent and waterstop as close as possible to time of actual concrete placement. Do not allow epoxy bonding agent to dry. Deposit concrete as nearly as practical in its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.

1. Screed concrete which is to receive other construction to the proper level to avoid excessive skimming or grouting.
2. Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the job site and dispose of it in an acceptable location.
3. Do not place concrete until all forms, bracing, reinforcement, and embedded items are in final and secure position.
4. Unless otherwise approved, place concrete only when Engineer is present.

- B. Concrete Conveying:

1. Handle concrete from the point of delivery and transfer to the concrete conveying equipment and to the locations of final deposit as rapidly as practical by methods which will prevent segregation and loss of concrete mix materials.
2. Provide mechanical equipment for conveying concrete to ensure a continuous flow of concrete at the delivery end. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, snow, ice and other deleterious materials.
3. Do not use chutes for distributing concrete unless approved in writing by the Engineer.
 - a. Provide sketches showing methods by which chutes will be employed when requesting such approval.
 - b. Design chutes, if permitted, with proper slopes and supports to permit efficient handling of the concrete.
4. Pumping of concrete is permitted however, do not use aluminum piping to convey the concrete.

C. Placing Concrete into Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 18 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place concrete at such a rate that concrete which is being integrated with fresh concrete is still plastic with adequate vibration.
2. Do not permit concrete to free fall within the form from a distance exceeding 4 feet. Use "elephant trunks" and tremies to prevent free fall and excessive splashing on forms and reinforcement.
3. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
4. Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with the applicable recommended practices of ACI 309. Vibration of forms and reinforcing will not be permitted, unless otherwise accepted by the Engineer.
5. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the layer of concrete and at least 6 inches into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.
6. Force concrete under pipes, sleeves, openings and inserts from one side until visible from the other side to prevent voids.

D. Placing Concrete Slabs and Sidewalks:

1. Deposit and consolidate concrete slabs in a continuous operation, within the limits of expansion joints, until the placing of a panel or section is completed.
2. Consolidate concrete during placing operations using mechanical vibrating equipment, so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Bring slab surfaces to the correct level. Smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations. Coordinate applying contraction joint, per Section 03250, with finishing operations.

E. Bonding for Next Concrete Pour: Comply with Division 03250 and 03300 of these Specifications.

F. Quality of Concrete Work:

1. Make all concrete solid, compact and smooth, and free of laitance, cracks and cold joints.

2. All concrete for liquid retaining structures, and all concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
3. Cut out or chip out and properly replace to the extent ordered by the Engineer, or repair to the satisfaction of the Engineer, surfaces which contain cracks or voids, are unduly rough, or are in any way defective. Thin patches or plastering will not be acceptable.
4. All leaks through concrete, and cracks, holes or other defective concrete in areas of potential leakage, shall be repaired and made watertight by the Contractor.
5. Repair, removal, and replacement of defective concrete as ordered by the Engineer shall be at no additional cost to the City.

G. Cold Weather Placing:

1. Protect all concrete Work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 and as herein specified.
2. When the air temperature has fallen to or may be expected to fall below 40 F, provide adequate means to maintain the temperature, in the area where concrete is being placed, at between 50° F and 70° F for at least seven days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Maintain the heat and protection, if necessary, to insure that the ambient temperature does not fall below 30° F in the 24 hours following the seven-day period. Avoid rapid dry-out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
3. When air temperature has fallen to or is expected to fall below 40 F uniformly, heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 55° F and not more than 90° F at point of placement.
4. Do not use frozen materials containing ice or snow. Ascertain that forms, reinforcing- steel, and adjacent concrete surfaces are entirely free of frost, snow and ice before placing concrete.
5. Do not use salt and other materials containing anti-freeze agents or chemical accelerators, or set-control admixtures, unless approved by the Engineer, in mix designs.

H. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90° F when the temperature is rising and below 85° F when the temperature is falling. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated by the Engineer in the total amount of mixing water.

3. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Wet forms thoroughly before placing concrete.
5. Do not place concrete at a temperature so as to cause difficulty from loss of slump, flash set, or cold joints.
6. Do not use set-control admixtures unless approved by the Engineer in mix designs.
7. Obtain ENGINEER'S approval of other methods and materials proposed for use.

3.04 FINISH OF FORMED SURFACES

A. Rough Form Finish:

1. Standard rough form finish shall be the concrete surface having the texture imparted by the form material used. For vertical surfaces, all tie holes and defective areas to be repaired and patched with mortar of 1 part cement to 1 1/2 parts sand and all fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
2. Use rough form finish for the following:
 - a. Exterior vertical surfaces up to 1 foot below grade.
 - b. Interior exposed vertical surfaces of liquid containers up to operating floor level except areas to receive sealers and/or coatings.
 - c. Undersides of breakaway of slabs.
 - d. Other areas shown.

B. Smooth Form Finish:

1. Produce smooth form finish by selecting form materials which will impart a smooth, hard, uniform texture. Arrange panels in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas as above with all fins or other projections completely removed and smoothed.
2. Use smooth form finish for surfaces that are to be covered with a coating material. The material may be applied directly to the concrete or may be a covering bonded to the concrete such as waterproofing, damp proofing, painting or other similar system.

C. Smooth Rubbed Finish:

1. Provide smooth rubbed finish in accordance with ACI 301-84, to concrete surfaces which have received smooth form finish and receive as follows:
 - a. Rubbing of concrete surfaces not later than the day after form removal.
 - b. Moistening of concrete surfaces and rubbing with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process, unless the Engineer review and approves.

2. Except where surfaces have been previously covered as specified above, use smooth rubbed finish for the following:
 - a. Exterior exposed walls and other vertical surfaces down to 1 foot below grade.
 - b. Exterior horizontal surfaces, except exterior exposed slabs and sidewalks.
 - c. Interior exposed vertical surfaces.
 - d. Other areas shown.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surfaces, unless otherwise shown.

3.05 MONOLITHIC SLAB FINISHES

- A. Float Finish: After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently. Use a wood float only. Check and level the surface plane to a tolerance not exceeding 1/4 inch in 10 feet when tested with a 10 foot straightedge placed on the surface at not less than 2 different angles. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.
- B. Trowel Finish:
 1. After floating, begin the first trowel finish operation using a power-finish trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
 2. Consolidate the concrete surface by final hand troweling. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8 inch in 10 feet when tested with a 10 foot straight edge, and all edges adjacent to walls will have a struck, tooled intersection joint. Apply to operating floor slab.
- C. Non-Slip Broom Finish:
 1. Apply non-slip broom finish to exterior concrete platforms, sidewalks, drives, interior drive areas and elsewhere as shown on the Drawings or in schedules.
 2. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use fiber-bristle broom unless otherwise directed. Coordinate the required final finish with the Engineer before application.

3.06 CONCRETE CURING AND PROTECTION

- A. General:
 1. Protect freshly placed concrete from premature drying and excessive cold or hot temperature, and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.
 2. Start initial curing after placing and finishing concrete as soon as free moisture has disappeared from the concrete surface. Keep continuously moist for not less than 72 hours.

3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least 7 days and in accordance with ACI 301 procedures. Avoid rapid drying at the end of the final curing period.

B. Curing Methods:

1. Perform curing of all concrete by moist curing or by moisture-retaining cover curing. Use curing compound when approved by the ENGINEER and as herein specified. For curing, use water that is free of impurities which could etch or discolor exposed, natural concrete surfaces.
2. Provide moisture curing by any of the following methods:
 - a. Keeping the surface of the concrete continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering the concrete surface with the specified absorptive cover, thoroughly saturating the cover with water, and keeping the absorptive cover continuously wet with sprinklers or porous hoses. Place absorptive cover so as to provide coverage of the concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
3. Provide moisture-retaining cover curing as follows: Cover the concrete surfaces with the specified moisture-retaining cover for curing concrete, placed in the widest practical width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
4. Provide liquid curing compound as follows: Apply the specified curing and sealing compound to all exposed slabs not receiving chemical hardener or epoxy floor sealer. The compounds shall be applied immediately after final finishing in a continuous operation by power spray equipment in accordance with the manufacturer's directions. Recoat areas which are subjected to heavy rainfall within 3 hours after initial application. Maintain the continuity of the coating and repair damage to the coat during the entire curing period. For concrete surfaces which will be in contact with potable water, the manufacturer shall certify that the curing compound used is nontoxic. Liquid curing compound will only serve as the initial step. Final cure by providing a moisture-retaining cover. Curing compound with petroleum or wax bases are not acceptable.

- C. Curing Formed Surfaces:** Cure formed concrete surfaces, including the walls, supported slabs and other similar surfaces by moist curing with the forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as approved by the Engineer.

D. Curing Unformed Surfaces:

1. Initially cure unformed surfaces, such as slabs, sidewalks and other flat surfaces by applying the specified curing compound.
2. Final cure unformed surfaces, unless otherwise specified, by moisture-retaining cover curing.
3. Provide moisture curing for surfaces receiving chemical hardener or epoxy floor sealer.

E. Temperature of Concrete During Curing:

1. When the atmospheric temperature is 40° F and below, maintain the concrete temperature between 50° F and 70° F continuously throughout the curing period. When necessary, make arrangement before concrete placing for heating, covering, insulation or housing as required to maintain the specified temperature and moisture conditions continuously for the concrete curing period. Provide cold weather protection complying with the requirements of ACI 306.
2. When the atmospheric temperature is 80° F and above, or during other climatic conditions which will cause too rapid drying of the concrete, make arrangements before the start of concrete placing for the installation of wind breaks or shading, and for fog spraying, wet sprinkling, or moisture-retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protection complying with the requirements of ACI 305, unless otherwise specified.
3. Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceed 5° F in any one hour and 50° F in any 24 hour period.

F. Protection from Mechanical Injury: During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations.

3.07 FIELD QUALITY CONTROL

A. Testing for concrete field quality control shall be performed by an independent testing laboratory selected by the Contractor. Cost of testing will be paid from the Lump Sum Price. Engineer will direct the number of slump tests and cylinders required. Contractor shall make standard compression test cylinders and entrained air tests as specified below, under the direct inspection by the Engineer. Contractor shall furnish all necessary assistance required by the Engineer. Contractor shall also furnish all labor, material and equipment required including cones, rods, molds, air tester, thermometer, curing in an insulated storage box that is heated if necessary and all other incidentals required. Above will be subject to approval by Engineer. Contractor shall furnish all necessary storage, curing, and transportation required by the testing.

B. Quality Control Testing During Construction:

1. Perform sampling and testing for field quality control during the placement of concrete, as follows:
 - a. Sampling Fresh Concrete: ASTM C 172.
 - b. Slump: ASTM C 143; one for each set of compressive strength test specimens.
 - c. Air Content: ASTM C 231; one for each set of compression cylinders cast.
 - d. Compressive Strength Tests: ASTM C 39; one set of compression cylinders for each 50 cubic yards of fraction thereof, of each mix design placed in any one day; 1 specimen tested at 3 and 7 days, and 2 specimens tested at 28 days.
2. Adjust mix if test results are unsatisfactory and resubmit for ENGINEER'S approval.

3. Concrete which does not meet the strength requirements is subject to rejection and removal from the Work, or to other such corrective measures as directed by the Engineer, at the expense of the Contractor.
 - a. Compression Test Specimens: ASTM C 1; make one set of 4 standard cylinders for each compressive strength test, unless otherwise directed.
 - b. Concrete Temperature: Test hourly when air temperature is 40 F and below, and when 80 F and above; and each time a set of compression test specimens is made.
4. The testing laboratory shall submit certified copies of test results directly to the Engineer and the Contractor within 24 hours after tests are made.

C. Evaluation of Quality Control Tests:

1. Do not use concrete delivered to the final point of placement which has slump temperature or total air content outside the specified values.
2. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of three consecutive compressive strength tests equal or exceed the 28 day design compressive strength of the type or class of concrete; no individual strength test falls below the required compressive strength by more than 500 psi.
3. Where questionable field conditions may exist during placing concrete or immediately thereafter, strength tests of specimens cured under field conditions will be required by the Engineer to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded at the same time and from the same samples as the laboratory cured specimens.
4. Provide improved means and procedures for protecting concrete when the 28 day compressive strength of field-cured cylinders is less than 85 percent of companion laboratory cured cylinders.
5. When laboratory-cured cylinder strengths are appreciably higher than the minimum required compressive strength, field-cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.
6. If individual tests of laboratory-cured specimens produce strengths more than 500 psi below the required minimum compressive strength, or if tests of field-cured cylinders indicate deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question will be required at the CONTRACTOR'S expense.
7. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to replacement, reconstruction or to other action approved by Engineer, and shall be done at the Contractor's expense.

D. Testing Concrete Structure for Strength:

1. When there is evidence that the strength of the in-place concrete does not meet specification requirements, Contractor shall employ at his expense the services of a concrete testing service to take cores drilled from hardened concrete for compressive strength determination. Tests shall comply with ASTM C 42 and the following:
 - a. Take at least 3 representative cores from each member or suspect area at locations directed by Engineer.
 - b. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85 percent and no single core is less than 75 percent of the 28 day required compressive strength, and at least 100% by 56 days.
 - c. Report test results in writing to Engineer on the same day that tests are made. Include in test reports the Project identification name and number, date, name of Contractor, name of concrete testing service, location of test core in the structure, type of class of concrete represented by core sample, nominal maximum size aggregate, design compressive strength, compression breaking strength and type of break (corrected for length-diameter ratio), direction of applied load to core with respect to horizontal plane of the concrete as placed, and the moisture condition of the core at time of testing.
2. Fill core holes solid with patching mortar, and finish to match adjacent concrete surfaces.
3. Conduct static load test and evaluations complying with ACI 318 if the results of the core tests are unsatisfactory, or if core tests are impractical to obtain, as directed by Engineer.

E. Testing for Watertightness of Concrete Structures.

1. All concrete structures designed to contain or convey fluid shall be tested for watertightness by the Contractor prior to earth backfilling by filling with water to levels approximating what will be attained during operation and measuring the drop in level due to leakage, if any. These tests shall be made under the direction of the Engineer, and if necessary the tests shall be repeated until watertightness is insured. Perform tests prior to backfilling below grade structures and prior to installations of any coating.
2. Rate of filling shall be limited to minimize shock-effect to new concrete construction. Water shall be held under each condition long enough to satisfy the Engineer that the structures are watertight. Structures shall be free of internal or external water leakage.
3. The total loss of water-level in any basin or flume shall not exceed 1/2 in. (13 mm) depth in 24 hours. Leakage shall be located and stopped and the structure again tested until this requirement is met. If the structure does not meet the test, the Contractor shall repair or replace at his own expense, such part of the work as may be necessary to secure the desired results, as approved by the Engineer.
4. Regardless of the rate of leakage there shall be no visible leakage from any concrete structure.

3.08 MISCELLANEOUS CONCRETE ITEMS

Filling-In:

1. Fill-in holes and openings left in concrete structures for the passage of work by other contractors and as indicated on drawings, with non-shrink nonmetallic grout per Section 03250 of these Specifications.
2. Dry packing will be approved by the Engineer on case by case basis.

3.09 CONCRETE REPAIRS

A. Repair of Formed Surfaces:

1. Repair exposed-to-view formed concrete surfaces that contain defects which adversely affect the appearance of the finish. Surface defects that require repair include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, and holes left by the tie rods and bolts; fins and other projections on the surface; and stains and other discolorations that cannot be removed by cleaning.
2. Repair concealed formed concrete surfaces that may contain defects that adversely affect the durability of the concrete. Surface defects that require repair include cracks in excess of 0.01 inch wide, cracks of any width and other surface deficiencies which penetrate to the reinforcement or completely through non-reinforced sections, honeycomb, rock pockets, holes left by tie rods and bolts, and spalls except minor breakage at corners.
3. Pressure grout structural cracks, and cracks in water-holding structures, using one of the following:
 - a. Sikadur 35, Hi-Mod LV Gel by Sika Chemical Company.
 - b. 881 LPL Epoxy by the Burke Co.
 - c. Or equal.
4. Repair and patch defective areas with sand cement mortar immediately after removal of forms and as directed by Engineer.
5. Cut out or chip out honeycomb, rock pockets, voids over 1/2-inch diameter, and holes left by tie rods and bolts, down to solid concrete but, in no case, to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Before placing the cement mortar, thoroughly clean, dampen with water, and brushcoat the area to be patched with the specified bonding agent.
 - a. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, the patching mortar color will match the color of the surrounding concrete.
 - b. Contractor shall impart texture to repaired surfaces to match texture of existing adjacent surfaces. Provide test areas at inconspicuous locations to verify mixture, texture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.
6. Fill holes extending through concrete by means of a plunger-type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to insure complete filling.

7. Sandblast exposed-to-view surfaces that require removal of stains, grout accumulations, sealing compounds, and other substances marring the surfaces. Use sand finer than No. 30 and air pressure from 15 to 25 psi.

B. Repair of Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish. Correct low and high areas as herein specified.
2. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.
3. Repair finish of unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects, as such, include crazing, cracks in excess of 0.01-inch wide or which penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
4. Grout structural cracks, and cracks in water holding structures, using one of the following:
 - a. Sikadur 35, Hi-Mod LV Gel by Sika Chemical Company.
 - b. 881 LPL Epoxy by the Burke Co.
 - c. Or equal.
5. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent area.
6. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Use one of the following:
 - a. Mastertop MP by Master Builders.
 - b. Sikatop by Sika Chemical Company.
 - c. Or equal.
7. Repair defective areas, except random cracks and single holes not exceeding 1-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cut, and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen all concrete surfaces in contact with patching concrete and brush with the specified bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of the same materials and proportions to provide concrete of the same type or class as the original adjacent concrete. Place, compact and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
8. Repair isolated random cracks, and single holes not over 1-inch diameter, by the dry-pack method. Groove the top of cracks, and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen all cleaned concrete surfaces and brush with the specified bonding agent. Place dry-pack before the cement grout takes its initial set. Mix dry-pack, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack

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mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.

9. Repair methods not specified above may be used if approved by the Engineer.

+++ END OF SECTION 03300 +++

Attachment No. 9

Section 01060, Regulatory Requirements

SECTION 01060 REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

- A. Permits and Responsibilities: The Contractor shall be responsible for complying with all applicable federal, state, county and municipal laws, codes and regulations, in connection with the prosecution of the Work and for obtaining all permits including but not limited to NPDES permits for storm water discharges from the Work site.
- B. Permits and applications for this project are identified in PART 3 of this Section.
- C. The Contractor shall comply with all requirements of the permitting authority, whether permits were obtained by the Contractor or not.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.01 NPDES PERMITS FOR STORM WATER DISCHARGES

The Contractor shall comply with the provisions of the Authorization to Discharge under the National Pollutant Discharge Elimination System, Storm Water Discharges Associated with Construction Activity for Infrastructure Construction Projects, Georgia Environmental Protection Division General Permit No. GAR 100002, including but not limited to filing permit applications, filing Notice of Intent (NOI), filing Notice of Termination (NOT), performing inspections and monitoring and performing record keeping as required.

3.02 CITY LANE CLOSURE PERMITS

The Engineer, in conjunction with the Contractor, will submit permit applications to the City's Department of Public Works, Office of Transportation for all lane closures required for completion of the project. Refer to Section 01550, Traffic Regulation.

3.03 OTHER PERMITS

The Contractor shall submit applications for and obtain all other permits required in conjunction with completion of the Work of the Contract.

3.04 GENERAL

- A. The Contractor shall pay for all remaining permits, fees and licenses required for construction of the Project.
- B. The Contractor shall examine all permits and conform to the requirements contained therein, including the purchase of additional bonds or insurance as specified therein, and such requirements are hereby made a part of these Contract Documents as though the same were set forth herein. Failure to examine the permit and agreement applications will not relieve the Contractor from compliance with the requirements stated therein.
- C. Payment for all permits, fees and licenses required for construction of the Project shall be included in the Lump Sum Price.

+++ END OF SECTION 01060 +++

Attachment No. 10

Section 01200, Measurement and
Payment

**SECTION 01200
MEASUREMENT AND PAYMENT**

PART 1 GENERAL

1.01 SCOPE

- A. Work includes furnishing all plant, labor, equipment, tools, materials, and performing all operations required to complete the Work satisfactorily, in-place, as specified and as indicated on the Drawings.
- B. All costs of required items of work and incidentals necessary for the satisfactory completion of the Work shall be considered as included in the Total Bid. The cost of work not directly covered by the pay items shall be considered incidental to the contract and no additional compensation shall be allowed.
- C. The Contractor shall take no advantage of any apparent error or omission on the Drawings or Specifications, and the Engineer shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.

1.02 SUBMITTALS

- A. The Contractor shall submit to the Engineer for approval, in the form directed or acceptable to the Engineer, a complete schedule of values of the various portions of the Work, including quantities and unit prices, aggregating the Contract Price. An unbalanced breakdown providing for overpayment to the Contractor on items of Work, which would be performed first, will not be approved.
- B. Submit application for payment on a form approved by the Engineer. Form shall contain unit price items, lump sum items and allowance items in accordance with Special Condition SC-16.

1.03 UNIT PRICE ITEMS

- A. Payment for all work shall be in accordance with the unit price bid items in the Bid Schedule and shall be full compensation for all labor, materials, and equipment required to furnish, install, construct, and test the Work covered under the unit price bid item. Work for which there is no price schedule item will be considered incidental to the Work and no additional compensation shall be allowed.
- B. Payment will be made only for the actual quantities of work performed in compliance with the Drawings and Specifications. The Contractor will be paid an amount equal to the approved quantity times the applicable unit price. Any unused balance of the unit price work shall revert to the City upon completion of the project.

- C. All unit price work shall be considered as part of the Work to be performed within the time limits specified elsewhere for Substantial Completion and Project Completion. No increase in contract time will be allowed for increases in quantities of unit price work performed beyond the quantities shown in the Bid Schedule, unless it can be demonstrated that the additional Work performed under the unit price item is on the critical path of the Project Schedule.

1.04 LUMP SUM ITEMS

- A. Payment of the lump sum items established in the Contractor's Bid shall be full compensation for all labor, materials, and equipment required to furnish, install, construct, and test the Work covered under the lump sum bid items.
- B. Payment of the lump sum items established in the Contractor's Bid shall also fully compensate the Contractor for any other work which is not specified or shown, but which is necessary to complete the Work.
- C. The lump sum items shall be specifically subdivided by activity, broken-out in the Schedule of Values.
- D. Payments for the lump sum items specifically broken-out in the Schedule of Values will be based upon physical progress for each activity in accordance with the breakdown of the Lump Sum prices agreed to in the Schedule of Values.

1.05 MEASUREMENT OF QUANTITIES

- A. Final payment quantities shall be determined from the record drawings. The record drawing lengths, dimensions, quantities, etc. shall be determined by a survey after completion of all required work. The precision of final payment quantities shall match the precision shown for that item in the Bid Schedule. Measurements will be taken according to the United States standard measurements and in the manner as specified in these Specifications.
- B. Measurement Devices
 - 1. Scales shall be inspected, tested, and certified by the applicable Weights and Measures Department within the past year and shall be of sufficient size and capacity to accommodate the conveying vehicle.
 - 2. Metering devices shall be inspected, tested, and certified by the applicable department within the past year.
 - 3. Volume shall be determined by cubic dimension by multiplying mean length by mean width by mean height or thickness.

4. Area shall be determined by square dimension by multiplying mean length by mean width or height.
5. Linear measurement shall be measured by linear dimension, along the item centerline or mean chord.
6. Stipulated price measurement shall include items measured by number, weight, volume area, length or combination thereof as appropriate.

<u>Item</u>	<u>Method of Measurement</u>
AC	Acre - Field Measure
AL	Allowance
CY	Cubic Yard - Field Measure within limits specified or shown, or measured in vehicle by volume, as specified
EA	Each - Field Count
GAL	Gallon - Field Measure
HR	Hour
LB	Pound(s) - Weight Measure by Scale
LF	Linear Foot - Field Measure
LS	Lump Sum - Unit is one; no measurement will be made
SF	Square Foot - Field Measure
SY	Square Yard - Field Measure
TON	Ton - Weight Measure by Scale (2,000 pounds)
VF	Vertical Foot - Field Measure

C. General

1. No separate or additional payment shall be made for the requirements contained in the Special Conditions of the Contract Documents. The cost for complying with these requirements shall be included in the unit price bid for the items to which they pertain.
2. No separate or additional payment shall be made for the requirements contained in the individual specification sections contained in Division 1 - General Requirements of the Technical Specifications. The cost for complying with these requirements shall be included in the unit price bid for the items to which they pertain.
3. No separate or additional payment shall be made for mobilization of the Project Site. The cost for mobilization shall be included in the unit price bid for the items to which it pertains.

SECTION 1 – BID ITEMS**1.06 ITEM 1 - CONSTRUCT CHECK VALVE VAULTS COMPLETE****A. Measurement and Payment**

1. Payment to the Contractor of the total lump sum price bid for Item 1 in the Bid Schedule for construction of the check valve vaults shall fully compensate the Contractor for furnishing all labor, materials, equipment and incidentals required to complete the work as specified in Divisions 1 through 16 excluding those items for which measurement and payment is specified below.
2. Payment shall also full compensate the Contractor for any other work which is not specified or shown but which is required to complete the work of Item 1 as shown on the Drawings and as specified herein including all requirements of the General Conditions and the Special Conditions.

1.07 ITEM 2 – ROCK EXCAVATION**A. Measurement and Payment**

1. When rock is encountered, the material shall be uncovered and the Engineer notified. The Contractor will then take cross sections of the rock surface as directed by the Engineer. If the Contractor fails to uncover the rock, notify the Engineer, and allow ample time for cross sectioning the undisturbed material, the Contractor shall have no right of claim to any classification other than that allowed by the Engineer. Removal of old concrete foundations, if any, shall be classified as rock.
2. All rock excavated within 2 feet from the outside face of all vaults or structures will be measured for payment. No measurement and payment will be made for over breakage.
3. Measurement for depth for payment shall extend to the bottom of the slab or footing or bottom of gravel as shown on the drawings, unless otherwise specified by the Engineer.
4. In the case of pipe trenches, payment lines shall be from the upper surface of the rock encountered to depth of 8 inches below the invert of the pipe, and a width of 2 feet plus outside diameter of pipe.
5. Payment for rock excavation will be made for the quantities as above determined, measured in cubic yards, at the contract unit price stated in the Bid Schedule which price and payment shall be full compensation of excavation, blasting and disposal of rock, backfilling and providing common fill for any deficiency of backfill, and all else incidental thereto or which payment is not provided under other items.

1.08 ITEM 3 - EXCAVATION BELOW NORMAL GRADE AND CRUSHED STONE REFILL

A. Measurement

1. Measurement of excavation below normal grade and refill for trench excavation will extend only downward from the elevation below the pipe bell as shown in the following table to a depth determined by the Engineer and for a width as defined for rock excavation.

Pipe Diameter	Normal Grade (elev.) below Pipe Bell
Up to 21 inches	8-inches
24-inches and greater	12-inches

2. If the trench bottom is below grade through error by the Contractor, or if improper drainage softens the sub grade and additional excavation in the trenches is required before laying the pipe, such removal and replacement of material will not be measured for payment.
3. No material which may run or flow into the excavation from outside the payment limits, shall be measured for payment.
4. Measurement by truck count will not be permitted.
5. Crushed stone placed or removed outside the above limits will not be measured for payment.

B. Payment

1. Payment for excavation below normal grade and crushed stone refill will be made for the quantity as above determined at the unit price established in the Bid Schedule and shall be full compensation for sheeting, shoring and bracing, drainage and dewatering, excavation and disposal of all materials below normal grade, borrow pit operations, furnishing, hauling, placing, compacting the crushed stone, and all else in connection therewith or incidental thereto for which payment is not provided under other items in the Bid Schedule.
2. Crushed stone for bedding pipes and appurtenances is to be furnished and paid for under other items.
3. Crushed stone used for sub base for valve vaults for air release and vacuum valves is to be furnished and paid for under another item.
4. Suitable borrow fill required to replace rock excavation where surplus excavation is inadequate or unsuitable shall be furnished and paid for under another item.

5. Any crushed stone employed for drainage purposes shall be paid for under the applicable items.

SECTION 2 – ALLOWANCES

2.01 ALLOWANCES

- A. The allowances specified in the Bid Schedule are to establish a fund to pay the cost of items for which the City could not establish accurate quantities and/or detailed scope of work. This work shall be completed only at the written direction of the Engineer, and the cost of such work shall be approved prior to performance of the work.
- B. The Contractor shall be responsible for the payment for these services to the appropriate payee providing such service, and shall submit evidence of payments to the Engineer prior to its inclusion in the progress payments.
- C. Payment will be made for invoices submitted by the Contractor subject to the Contract Documents. Contractor will not receive any additional compensation for bond or insurance costs for work executed using allowance funding.
- D. Allowance allocations shall only be paid to the Contractor for completed work authorized by the Engineer. All allowance dollar amounts not expended shall revert to the City at the completion of the project.
- E. Should the final allowance costs be less than the specified amount of the allowance the Contract will be adjusted accordingly by a change order. The amount of the change order will not recognize any changes in handling costs at the site, labor, overhead, profit and other expenses caused by the adjustment to the allowance item.

2.05 ITEM 4 – CITY DIRECTED COMPLIANCE TESTING

An allowance has been established as the value of this item. This allowance shall be used to pay the costs, where the amounts are determined as specified in General Condition Article GC-41.2.4 Force Account, for supplemental confirmation testing where directed by the Engineer not covered in Section 01400, Quality Assurance/Quality Control.

2.06 ITEM 5 – UNFORESEEN UTILITY CONFLICTS

- A. An allowance has been established as the value of this item. This allowance shall be used to pay the costs, where the amounts are determined as specified in General Condition Article GC-41.2.4 Force Account, for unforeseen utility conflicts as directed by the Engineer. This work may be required in the event utilities not shown on the Drawings are encountered and impact the contract related work.
- B. If the Contractor, during the course of construction, believes an underground utility conflict exists, the conflicting condition shall be exposed and the Engineer notified. The

Engineer will then determine whether an underground conflict actually exists. The Engineer's determination shall be final.

- C. If the Engineer determines that an underground utility conflict actually exists, the Contractor shall submit a plan to the Engineer detailing how the conflict is to be resolved. The plan shall include a detailed layout of existing and proposed piping. The plan shall be approved by the Engineer prior to the Contractor initiating any work.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

+++ END OF SECTION 01200 +++

Attachment No. 11

Exhibit D, Bid Schedule

2/19/15

BID SCHEDULE

HEMPHILL RESERVOIR #1 EMBANKMENT REPAIR

PROJECT NO. FC-7884

TO: The City of Atlanta, Georgia
_____, 201__

Submitted: _____

The undersigned, as Bidder, hereby declares that the only person or persons interested in this Bid, as principal or principals, is or are named herein and that no other person, than herein mentioned has any interest in this Bid or in the Agreement to be entered into, that this Bid is made without connection with any other person, company or parties making a Bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he has examined the Site of Work and informed himself full in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Agreement Documents for the Work furnished prior to the opening of Bids; and that he has satisfied himself relative to the Work to be performed.

The Bidder proposes and agrees, if this Bid is accepted, to contract with the City, in the form of Agreement specified, to furnish all necessary materials, equipment, means of transportation and labor necessary, and to complete this Project in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Agreement Document to the full and entire satisfaction of the City, and with a definite understanding that no money will be allowed for extra work except as set forth in the Agreement Document.

Bidder hereby agrees to commence Work under this Agreement on or before a date to be specified in the written "Notice to Proceed" from the City.

The undersigned acknowledges receipt of addenda numbered _____ through _____

In accordance with the above understanding, the undersigned proposes to do all of the Work, furnish all of the Materials, and complete the Work in accordance with the Agreement Documents for the Total Bid.

2/19/15

BID SCHEDULE**HEMPHILL RESERVOIR #1 EMBANKMENT REPAIR****PROJECT NO. FC-7884****PART A – EMBANKMENT REPAIR**

SECTION 1 – BID ITEMS:					
The quantities of work shown on the Bid Schedule are approximate and the City reserves the right to add or delete quantities under each Bid Item and the Contractor agrees to perform the Work for the unit price listed in its bid.					
Item No.	Description	Estimated Quantity	Unit	Bid Unit Price	Extended Bid Price
1	Furnishing all products, materials and equipment and performing all labor necessary to complete and put into operation the Hemphill Reservoir #1 Repairs, including all work shown on the Drawings and/or specified.	1	Lump Sum	\$ _____	\$ _____
SECTION 2 - ALLOWANCES					
2A	Unforeseen Conditions	1	AL	\$150,000	\$150,000
2B	Monitoring-Independent Geotechnical, Testing & Inspections	1	AL	\$50,000	\$50,000
2C	Additional Fill	1	AL	\$25,000	\$25,000
2D	Dewatering and Removal of Fill	1	AL	\$100,000	\$100,000
2E	Specialty Contractor: Fabriform	1	AL	\$25,000	\$25,000

PART A BID SUMMARY		
Section	Item	Total
1	Bid Items (Items 1 through 3)	\$ _____
2	Allowances (Items 4 through 5)	\$350,000.00
TOTAL BID		\$ _____

PART B – CHECK VALVE INSTALLATION**SECTION 1 – BID ITEMS:**

The quantities of work shown on the Bid Schedule are approximate and the City reserves the right to add or delete quantities under each Bid Item and the Contractor agrees to perform the Work for the unit price listed in its bid.

Item No.	Description	Estimated Quantity	Unit	Bid Unit Price	Extended Bid Price
1	Construct Valve Vaults complete, except for those Bid Items Listed Hereinafter Separately	1	Lump Sum	\$ _____	\$ _____
2	Rock Excavation	5	Cubic Yard	\$ _____	\$ _____
3	Excavation Below Normal Grade and Crushed Stone Refill	10	Cubic Yard	\$ _____	\$ _____

SECTION 2 - ALLOWANCES

4	City Directed Compliance Testing	1	AL	\$15,000.00	\$15,000.00
5	Unforeseen Utility Conflicts	1	AL	\$10,000.00	\$10,000.00

PART B BID SUMMARY

Section	Item	Total
1	Bid Items (Items 1 through 3)	\$ _____
2	Allowances (Items 4 through 5)	\$25,000.00
TOTAL BID		\$ _____

TOTAL BID SUMMARY

TOTAL BID SUMMARY		
Part	Item	Total
A	Part A Bid Summary	\$ _____
B	Part B Bid Summary	\$ _____
TOTAL BID		\$ _____

TOTAL BID: PARTS A & B, INCLUSIVE:

(In Words)

The bidder understands that:

- (1) The lengths of push-on and restrained joint pipe shown on the Bid Schedule are approximate only and are for bidding purposes only. In accordance with Section 02665, the selected pipe manufacturer will determine the actual lengths of each to be installed.
- (2) All quantities shown are approximate only and are subject to either increase or decrease and that should the quantities of any of the items of work be increased, the undersigned proposes to do the additional work at the unit prices set forth herein. Should the quantities be decreased, he also understands that payment will be made on actual quantities installed at the unit bid price. The undersigned will make no claims for anticipated profits for any decrease in the quantities and will make no claims for reimbursement for any losses created by any decrease in the quantities. Actual quantities will be determined upon completion of the project.
- (3) The undersigned also agrees that extra work, if any, performed in accordance with the General Conditions will be paid for in accordance with the provisions of those Articles.
- (4) In case of discrepancies between the amounts shown in the unit prices and the totals, the unit prices shall take precedence and the totals shall be corrected to agree with the unit prices. In case of discrepancies between the written amounts and figures, written amounts shall take precedence over figures and the sum of all bid extensions (of unit prices) shall take precedence over the TOTAL BID.

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- (5) The above prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, bonding, etc. to cover the finished work of the several kinds called for.

BID DATA (FOR PART B ONLY)

The Bidder designates below the manufacturers of products it intends to furnish and install if awarded this Contract (List the manufacturer upon whose equipment the bid was based). The Bidder understands that if it does not provide this information or does not offer products meeting all specification requirements and having approval of the Engineer, then it's bid will be determined to be non-responsive and will be rejected. The bidder is aware of the requirement that all manufacturers of items listed below not approved in the Specification must receive the written approval of the Engineer prior to the bid date.

Section	Equipment Items	Proposed Manufacturer
	Check Valves	_____
	Butterfly Valves	_____

Acceptance of this bid by the City does not constitute acceptance of the listed manufacturers as meeting the specifications.

The Contractor is responsible for assuring that the listed equipment manufacturers meet all requirements of the Contract Documents. No manufacturer of the listed equipment may be changed without written approval of the City.

The undersigned proposes and agrees to begin the work on a date to be specified in a written order of the Owner and to complete the amount of work herein contemplated within 180 consecutive calendar days to be specified in the written order.

The bidder hereby agrees to enter into a contract to begin and complete said work according to the Drawings and Specifications and all the terms and conditions of the advertisement, instructions to bidders, and of the proposal, and within ten (10) days from the date of acceptance of this proposal, will furnish the required bonds and insurance.

Attached hereto is a bid bond or certified check for the sum of _____ (\$_____)

Dollars payable to the City of Atlanta, which check shall be held by the City (1) until the successful bidder shall have executed, as required, the contract and bond, and (2) in the event that the contract is awarded to the undersigned and he shall fail to execute, as

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required, the contract and bond, then said check shall be retained as and for liquated damages for such failures, otherwise said check shall be returned to the undersigned.

The undersigned hereby agrees that the City has the right to reject any or all bids and the undersigned shall not dispute the quantities used in preparing the bids.

Respectfully Submitted,

SEAL
(If bid is by a Corporation)

Signature of Person, Firm or
Corporation Making Bid

Title

Business Address